LINN GANA
QK91
.C775
1832
v.5

# MEDICAL BOTANY:

CONTAINING

*SYSTEMATIC AND GENERAL DESCRIPTIONS,*

WITH

**Plates of all the Medicinal Plants,**

COMPREHENDED IN THE

*CATALOGUES OF THE MATERIA MEDICA,*

AS PUBLISHED BY THE

ROYAL COLLEGES OF PHYSICIANS OF LONDON, EDINBURGH, AND DUBLIN;

TOGETHER WITH THE PRINCIPAL MEDICINAL PLANTS NOT INCLUDED IN THOSE PHARMACOPŒIAS.

*ACCOMPANIED WITH A CIRCUMSTANTIAL DETAIL OF THE MEDICINAL EFFECTS, AND OF THE DISEASES IN WHICH THEY HAVE BEEN MOST SUCCESSFULLY EMPLOYED.*

---

BY

WILLIAM WOODVILLE, M.D. F.L.S.

---

THIRD EDITION,

*IN WHICH THIRTY-NINE NEW PLANTS HAVE BEEN INTRODUCED.*

---

THE BOTANICAL DESCRIPTIONS ARRANGED AND CORRECTED BY

DR. WILLIAM JACKSON HOOKER, F.R.S. L.S. &c.

*Who has added an Index following the Arrangement of Jussieu.*

THE NEW MEDICO-BOTANICAL PORTION SUPPLIED BY

G. SPRATT, ESQ. AUTHOR OF THE FLORA MEDICA,

*Under whose immediate Inspection the whole of the Plates have been coloured.*

---

IN FIVE VOLUMES.

VOL. V.

---

LONDON:

PUBLISHED BY JOHN BOHN, 17, HENRIETTA STREET.

1832.

*Pinus balsamea.*

C. Spratt del.

# ORD. I. CONIFERÆ.

## PINUS BALSAMEA. BALM OF GILEAD FIR.

*SYNONYMA.* Abies taxi folio, odore balsami Gileadensis. *Du Hamel, Arb.* v. *l.* 3. *n.* 3. Pinus balsamea. *Willd. v.* 4. *p.* 504; *Lin. Sp. Pl.* 1421; *Ait. Kew. Ed.* 2. *v.* 5. *p.* 319; *Lambert.* 48. *t.* 31. Abies balsamifera. *Mich. Boreal-Amer. v.* 2. 207; *Mich. Arb. For. v.* 1. 145. *t.* 14.

*Class* Monoecia. *Ord.* Monadelphia. *Nat. Ord.* Coniferæ. *Linn. Juss.*

*Gen. Char.* Male flower in a *catkin*, naked. *Calyx* O. *Corolla* O. *Stamens* numerous, on a common stalk.

Female flower in a *catkin* or cone of close, rigid, two-lipped, two-flowered *scales*; *Seeds*, two to each scale, winged.

*Sp. Char.* *Leaves* solitary, flat, imperfectly two-ranked. *Cones* cylindrical, erect, with sharp pointed scales. *Crest* of the anthers pointless.

THIS species of pine forms a very beautiful *tree*, rising to the height of about forty feet: the *trunk*, which measures from twelve to fifteen inches in diameter, is straight, and covered with a smooth, whitish grey *bark*. The *leaves* are very fragrant, disposed on either side of the branches, like the teeth of a comb; they are solitary, flat, linear, short, not exceeding eight lines in length, and pointed; of a bright green on their upper surface, paler

beneath, and marked with whitish lines. The *male catkins* are ovate; the crest of the *anthers* kidney-shaped, pointless, or furnished with short spines, but never bifid; the *females* with numerous ovate, notched, pointed bracteas. The *cones*, which stand erect upon the branches, are large, nearly cylindrical, and when full grown, of a beautiful, deep, glossy, purple colour, inclining to black, and exuding a great quantity of transparent resin, which gives them a very beautiful appearance. Figure (*a*) represents a female catkin, (*b*) a male catkin, (*c*) scales of a catkin, (*d*) its bracteolæ, (*e*) the anthers, (*f*) scale of a cone.

The *Pinus balsamea* is a native of the coldest regions of North America, growing abundantly in Canada, Nova Scotia, New England, and the other northern provinces. It has been cultivated in this country since 1698, but our climate does not appear to be congenial to it, for although it attains a considerable height, it seldom survives above twenty years.*

The fine *turpentine* of the shops, or what is commonly called *Canada balsam*, is yielded by this tree. It exists in great quantity, in the vesicles between the wood and bark; being collected by making incisions in the trunk of the tree, through which it exudes. It is imported into this country in casks, weighing about one cwt. each.

*Sensible and Chemical Properties, &c.* *Canada balsam*, or turpentine, has a strong, but rather agreeable odour; its taste is somewhat bitter, and resembles the other turpentines; its colour is pale yellow, with a greenish tinge, transparent, and has the consistence of honey fresh from the comb.

Distilled with water, it yields a limpid, colourless, essential oil, and leaves a solid resin, resembling the common yellow resin. Distilled by itself, it yields, first, a clear oil, in appearance like that obtained by distillation with water, but which gradually changes to yellow, and then red, and leaves a black resin. During the operation of distillation, succinic acid also rises.† It is insoluble in water, but soluble in alcohol and ether, also in the volatile and drying oils; it is soluble in alkaline leys and the strong acids; the sulphuric and nitric acids convert it into artificial tannin. The essential oil, or spirit of turpentine, as it is commonly called, has a strong penetrating

* Some of the largest and oldest trees are said to be on the estate at Warwick Castle, and at Woburn, the seat of the Duke of Bedford.

† Annales de Chim. xxi. 328.

odour, and a hot, pungent, bitterish taste. It is perfectly limpid and colourless, light, volatile, inflammable, and burns with a very vivid, crackling flame. It is soluble in six parts of sulphuric ether, very sparingly soluble in cold alcohol, one hundred parts unite with twenty of alcohol; if the alcohol be heated, the oil readily combines with it, but will be separated again as soon as the spirit cools. A stream of oxymuriatic gas passed through it, converts it into a yellow resin. Distilled with four times its volume of water, it becomes lighter and brighter.

*Medical Properties and Uses. Canadian balsam* possesses similar medicinal properties to the other turpentines, which have been fully described under the article *Pinus sylvestris*, *Pinus abies*, *Pinus picea*, and *Pinus larix*, in Vol. I. of this work. We have, therefore, only a few observations to make on the use of the *oil of turpentine* as a remedial agent, more especially for the expulsion of tænia. It was first recemmended by Dr. Fenwick as an anthelmintic* of very considerable powers. The Doctor prescribed it in doses of two ounces, and repeated it in ounce doses till it had the desired effect; purging is in general produced, and the worm is usually evacuated lifeless.† Turpentine, when given in large doses, by acting as a cathartic, seems to prevent its absorption; hence its action on the urinary organs becomes obviated, and stranguary, which so frequently accompanies the internal use of small doses of turpentine, is not to be apprehended; not only for the expulsion of tænia, but for other worms, (especially the *lumbrici*) it has been administered with equal success. Dr. Copeland‡ strongly recommends the oil in the hæmorrhagiæ, particularly in atonic epistaxis, also in epilepsy, in the last stages of puerperal fever, and in the convulsions of infants, when arising from a disordered state of the alimentary canal. It is also a powerful emmenagogue, thence useful in chlorosis. We are told by Dr. Copeland, that in some cases of ovarian dropsy, its effects were such as to recommend its employment in the incipient stages of that disease, and also in other dropsies. Externally, the oil of turpentine is used with much advantage as a primary application to scalds and burns. Dr. Kentish was the first who

* Vide Med. Chir. Trans. vol. ii. † Vide Med. & Phys. Jour. v. xlvi. p. 185 & seq.

‡ The action of *oil of turpentine* appears to differ from every other medicine that has been administered for the expulsion of tænia, by killing the worm; for we are told, that every worm that has been ejected by the oil of turpentine, generally had a livid hue, and was lifeless.

introduced its use* and subsequently his practice has been confirmed and adopted by many surgeons of skill and eminence. It is also topically applied as a discutient to indolent tumours, and as a rubifacient, in chronic rheumatism, sciatica, lumbago, &c.

* Vide Essay on burns.—To those who are unacquainted with the importance of turpentine oil, as an application to burns, we would recommend a perusal of Dr. Kentish's Essays, and Medical and Physical Journal, vol. iii. p. 262.

# ORD. II. AMENTACEÆ.

## QUERCUS INFECTORIA. STAINING OAK.

*SYNONYMA.* Quercus infectoria. *Willd. Sp. Pl. v.* 4. *p.* 436: Olivier. *Voy. dans l'Empire Othoman, Ate. t.* 14, 15. Farber Eiche. *Nom. Triv. Willd.*

*Class* Monoecia. *Order* Polyandria.

*Nat. Ord.* Amentaceæ. *Linn. et Juss.*

*Gen. Char.* Male flowers in a *catkin*. *Calyx* of several segments. *Corolla* none. *Stamens* five to ten.

Female. *Calyx* double, the outer inferior, scaly, undivided; the inner superior, of six deep segments. *Corolla none*. *Style* one. *Nut* coriaceous, surrounded at the base by the persistent calyx.

*Spec. Char.* *Leaves* oblong, mucronate-dentate, glabrous on both sides.

THE *Quercus infectoria* is a native of Asia Minor, and to be met with from the Bosphorus as far as Syria, and from the coast of the Archipelago to the frontiers of Persia. Olivier seems to have been the first who ascer-

*Quercus Infectoria.*

*G. Spratt del.*

tained this species of *quercus* to be the one which produces the galls of commerce.* We are told by General Hardwicke, in the narrative of his journey to Sirinagur, that he found this *quercus* growing in the neighbourhood of Adwaanie.† The greater part of the galls found in the Indian Bazaars are said to be brought from Persia by the Arab merchants.

This species of oak has a crooked *stem;* it seldom exceeds six feet in height, and more frequently assumes the character of a shrub than of a tree; the *leaves*, which are deciduous in Autumn, are on short *petioles*, glabrous, oblong, with three or four teeth on each side; the teeth oblong, obtuse, mucronate, as is the blunted apex, the base rounded, and generally unequal, of a bright green colour on both sides, but paler beneath. The *fruit* or *acorn* is solitary, elongated, smooth, twice or thrice as long as the *cup*, which is nearly sessile, in a slight degree downy and scaly. The *gall* appears upon the shoots of the younger branches, and soon acquires from four to twelve lines in diameter; the insect which produces it is the *Cynips Quercus-folii* of Linnæus (*Diplolepsis Gallæ-tinctoriæ* of Geoffroy) a small hymenopterous insect, or fly, with a fawn-coloured body, dark antennæ, and the upper part of its body of a shining brown. The insect punctures the tender shoot with its spiral sting, and deposits its eggs, which attain their full size in a day or two, before the larva is hatched. The eggs grow with the gall, and it is by the irritation which they keep up, (not, as has been supposed, by the maggot feeding on the juices of the plant) that the morbid excitement is maintained in the vessels of the part, sufficient for the production of this kind of vegetable wen. Figure (*a*) on the drawing represents the insect magnified, (natural size, about half an inch from the tip of one wing to the other,) (*b*) the larva, (*c*) a different sort of gall said by Olivier to grow on the same oak.

The sensible qualities of galls, and their medical properties and uses, have already been detailed under the article *Quercus Robur*, (see Vol. I. *p.* 25-27) we have therefore only to enlarge upon their *Chemical Properties.*

From the analysis of Sir H. Davy, we learn, that 500 grains of Aleppo galls yielded to pure water by lixiviation, 185 grains of solid matter, of which 130 were tannin; mucilage and matter rendered insoluble by evaporation, 12; gallic acid, and a little extractive, 31; saline and earthy matter, 12. The soluble part of galls is taken up by about forty times its weight of boiling water, the residue is tasteless. The watery infusion reddens tincture of

* Vide Olivier's Travels, (translation) p. 41. † Asiatic Researches, *v.* 6. *p.* 376.

litmus, and forms precipitates with solutions of the following substances :— isinglass, lime-water, subcarbonate of potass, acetate of lead, sulphate of copper, nitrate of silver, sulphate of iron, nitrate of mercury, tartrate of antimony, and the infusions of Columbo root, Cusparia bark, and Cinchona bark. The muriate of mercury renders the infusion milky and opaque; but no precipitate is formed. Nitrous acid, sulphate of zinc, infusion of quassia, ammonia, and infusion of saffron, occasion no precipitate. A saturated decoction of gall, on cooling, deposits a copious pale yellow precipitate, which appears to be purer tannin than can be got by any other process. Alcohol takes up nearly seven parts out of ten, and ether five. Newmann obtained from 960 grains of coarsely powdered galls, 840 watery extract, and afterwards 4 alcoholic; and inversely, 760 alcoholic, and 80 watery. The ethereal tincture, when evaporated on water, leaves on the side of the glass an opaque pellicle, and on the surface of the water small drops of an oily resinous-like matter, while the substratum of water becomes charged with tannin and gallic acid. The alcoholic tincture reddens litmus, and forms precipitates with the re-agents as the watery infusion. To what principles these precipitates are owing, remains to be ascertained. It is observed by Vauquelin, that the infusions of nut-galls and cinchona, agree in precipitating both gelatine and tartrate of antimony, and that they precipitate each other. We are told by Dr. Duncan, that, in his experiments, "a saturated mixture of the infusions of nut-galls and cinchona still precipitate gelatine; but infusions, separately saturated by gelatine, do not act on each other." Hence it appears, that the action of the infusions on each other, depends on principles contained in each, compatible with the presence of tannin, but re-acting on each other, and that gelatine precipitates the principles, along with the tannin. It has been generally asserted, that the precipitate of tannin and gelatine is insoluble in water, either cold or hot; but I find, that in boiling water, it not only becomes soft and viscid, but a certain portion is dissolved, which separates again when the solution cools."* M. Braconnot has discovered in nut-galls a new acid, which he has named *Ellagic*.† This acid is in the form of a white powder, with a slight tinge of red, it is insipid, inodorous, and insoluble in boiling water; combined with nitric acid, and gently heated, the mixture acquires a deep red colour. Galls also yield, by distillation with water, a small portion of a concrete, volatile oil.‡

* Edin. New Dispensatory. † Ann. de Chim. et Phys. t. ix. p. 187. ‡ Phil. Mag.

*Fig. 1.*

*Fig. 2.*

*Salix caprea.*

G. Spratt del.

# SALIX CAPREA. ROUND LEAVED SALLOW.

*SYNONYMA.* Salix latifolia inferne hirsuta. *Bauh. Hist. p.* 215. *Raii Hist.* 1422. *n.* 1. Salix latifolio rotunda. *Bauh. Pin.* 474. *Dill. App.* 37. *Raii Angl.* 3. *p.* 449. Salix caprea latifolia. *Fl. Lapp. Tab.* viii. *Fig.* 8. Salix caprea. *Lin. Sp. Pl.* 1448. & *Fl. Suec. n.* 900. *Gmel. Sib. p.* 137. *Hoffm. Sal.* i. 3. *With. Arrang. vol.* ii. *p.* 74. *Willd. Sp. Pl. v.* 4. *p.* 703. *Huds. Fl. Angl. Ed.* 2. *p.* 429. *Smith, Fl. Brit. p.* 1067. *Engl. Bot. t.* 1488. *Hook. Fl. Scot.* i. *p.* 286. *Smith, Engl. Fl. v.* 4. *p.* 225. *Hook. Br. Fl. p.* 425. *Salict. Wob. p.* 243. *t.* 122.

*Class* Dioecia. *Order* Diandria.*

*Nat. Ord.* Amentaceæ, *Juss.*

*Gen. Char.* Male. *Amentum* cylindrical. *Calyx* a scale. *Corolla* none. *Gland* at the bottom of the lower nectariferous.

Female. *Amentum* cylindrical. *Calyx* a scale. *Style* bifid. *Capsule* one-celled, two-valved. *Seeds* comose.

*Spec. Char.* *Leaves* ovate-elliptical, acute, serrated, and waved at the margin, downy beneath. *Stipules* semi-cordate. *Germens* pedicellate, lanceolate-subulate, silky. *Stigmas* sessile, undivided.

THE *Salix caprea* is indigenous to Britain, it sometimes becomes a moderately-sized *tree*, no other species of willow requiring so dry a soil; it blossoms in April, and enlivens the Spring with its numerous yellow flowers. The *trunk* rises to a considerable height, and sends off many spreading *branches*, which are covered with a smooth ash-coloured *bark*. The *leaves* are petiolate, four or five inches long, and about three broad, obtusely serrated, lanceolate, or ovate-oblong, of a dark green, and smooth or downy on the upper surface; beneath, of a bluish grey colour, somewhat cottony, and marked with a network of veins. There are sometimes no *stipules*, but when present, they usually accompany the uppermost leaves, are rounded and ob-

* Class Diandria. Order Monogynia. Withering's Arrangement of British Plants, 7th Edition.

scurely toothed. The *male catkin* is pale, cylindrical, one or two inches long, and one broad, with ovate, downy scales; *stamens* two, filiform and smooth; *nectary* composed of two yellow, glandular scales, the larger being between the stamen and the receptacle, and the smaller between the stamen and the scale. The *female catkins* oblong or cylindrical, on foot-stalks, which have six or seven scales; the *germen* ovate, supporting two bifid, erect *stigmas;* the *capsule* is ovate, and contains many small *seeds.* Figure (*a*) female flowers, (*b*) the same magnified, (*c*) the germen, (*d*) stigmas, (*e*) gland, (*f*) male flower, (*g*) the same magnified, (*h*) gland, (*i*) stamens.

The bark* of this speceies has not been chemically examined; its sensible qualities being however the same as the *white willow*, it probably contains similar constituent principles. As a remedial agent, it has been given with success, as a substitute for the *cinchona* bark, in the same diseases and under similar circumstances, in which the bark of the *white willow* has been administered; but the comparative powers of the two have not been defined. It certainly would be of some importance to ascertain, by a series of experiments, which of the species of willow might be administered with the greatest advantage. At present the shops are supplied from a variety of different species.

* The wood and branches of this species of willow are manufactured into a variety of useful articles: the bark has been used for tanning leather; bees extract much honey from its catkins; goats are said to be particularly fond of the foliage and young shoots.

## SALIX ALBA. COMMON WHITE WILLOW.

*SYNONYMA.* Salix. *Lob. Ic.* 2. *p.* 136. Salix vulgaris alba arborescens. *C. Bauh. Pin.* 473. *Dill. App. p.* 42. Salix maxima fragilis alba hirsuta. *J. Bauh. Hist. p.* 212. Salix arborea angusti folia vulgalis. *Raii Hist. n.* 1419. Salix alba. *Lin. Sp. Pl. p.* 1449. *Fl. Suec.* 2. *n.* 903. *Hort. Cliff.* 473. *Hud. fl. Angl. Ed.* 2. *p.* 430. *Light. Fl. Scot. p.* 609. *Hoff. Sal.* i. 7 & 8. *Willd. Sp. Pl. v.* 4. *p.* 710. *With. Arrang.* ii. *p.* 76. *Smith, Fl. Brit. p.* 1071. *Engl. Bot. t.* 2430. *Hook. Scot.* 1. *p.* 287. *Smith, Engl. Fl. v.* 4. *p.* 231. *Salict. Wob. p.* 271. *t.* 136. *Hook. Brit. Fl. p.* 418.

*Salix alba.*

G. Sowerby del

*Spec. Char.* *Leaves* elliptical-lanceolate, regularly glanduloso serrate, acute, silky beneath, often so above. *Germen* ovate acuminate, nearly sessile, glabrous. *Stigmas* sub-sessile, short, recurved, bifid. *Scales* short, pubescent at the margin.

THE common *White Willow* is a native of Britain, growing in woods, hedge-rows, and wet meadow and pasture land; flowering in April and May. It is a tall straight tree, and attains a very considerable size.* The *trunk* is covered with a cracked *bark* of a greyish colour; the branches are numerous, spreading widely; the *leaves* are alternate, on short petioles, sharply and elegantly serrated; their lower serratures, remote and glandular, shining, pubescent above, white and silky beneath; the *barren catkins* cylindrical, blunt, one and a half to two inches long, four lines broad, on foot-stalks which are half an inch long. *Stamens* two; *nectaries* two, one before the stamens, and inversely heart-shaped, the other behind them, and oblong. *Fertile catkins* slender, cylindrical, two inches long, three or four lines broad, on foot-stalks near an inch in length: the *style* is short; the *stigmas* bipartite, and thick; the *capsules* are nearly sessile, ovate, smooth, and of a brownish colour. The drawing represents a branch of a male plant, figure (*a*) a single scale of a male catkin, shewing the stamens, &c. (magnified), (*b*) a mature amentum of a female plant, (*c*) a single scale of the natural size, (*d*) the germen and stigmas magnified, (*e*) scale, (*f*) a seed.

We are told by Withering, that this species of *willow* prefers an open and moist situation, where it grows quickly, and bears lopping.† The wood is light, tough, pliable, and very white; hence it is much esteemed for many economical purposes:—viz. for making pails, chests, boxes, and for chips for willow bonnets, &c.; and also for the purpose of tanning leather. Horses, cows, and sheep, feed on the leaves and young shoots.

*Sensible Qualities and Chemical Properties, &c.* The *bark* is inodorous, somewhat bitter and astringent; water extracts these qualities: the decoc-

* A willow of this species, growing at Bury St. Edmunds, (called the Abbot's willow) measures in height seventy-five feet, in girth eighteen feet six inches, and contains 440 cubic feet of timber.—*Vide Streitt's Sylva Britannica.*

† The same author says, that, "whoever desires to shade a walk with willows, should set barren plants only; or they will soon multiply so as to form a thicket, instead of a walk."

tion is of a reddish colour; sulphate of iron produces a dark green precipitate; a solution of isinglass throws down a precipitate, at first blue, but changing to a buff colour; carbonate of ammonia, and potass, and also lime water, throw down precipitates of the same colour. The watery extract has a bitter taste, is somewhat brittle, of a reddish colour, and does not deliquesce. The alcoholic tincture is of a greenish yellow colour, and is rendered turbid by the addition of water; when evaporated, it leaves a bright yellow extract, which melts at a moderate heat, and emits an aromatic odour.* Hence it appears, that the constituents of the *white willow bark* are, extractive, bitter resin, gluten, and tannin.

M. A. Buchner of Munich† has lately discovered a bitter principle in the barks of the salix *incana* and *vitellina*, to which he has given the name of *salicine*. This substance, we are told by him, belongs to the class of alkaloids, and it is to this principle M. A. Buchner attributes the febrifuge properties of the different species of willow. To obtain this principle, he treated the bark with ammonia diluted with water, to dissolve the tannin; and afterwards exhausted it with water acidulated with sulphuric acid: this produced him a very bitter solution. He then precipitated the sulphuric acid and the colouring matter, by acetate of lead; and afterwards separated the excess of lead from the liquor, by means of the hydro-sulphuric acid. The liquor was then treated with the whites of eggs, and animal charcoal (ivory black), to separate the remaining colouring matter: by these means he obtained a very bitter solution, nearly colourless. Having boiled the liquor with caustic ammonia, he volatilized the acetic acid; during which the liquor took a yellowish tinge, the evaporation was continued until he obtained a soft extract, intermixed with crystals of salicine. In a second mémoire on the preparation and properties of salicine.‡ M. Buchner gives the preference to the following mode of preparing this substance:—viz. dissolve four parts of the extract of the bark of common willow‖ in 24 to 30 parts of water; and add

* Ann. de Chimie, liv. 290.

† *Vide* Extrait du Recueil de Pharmacie, rédigé par M. Buchner à Munich. *Journal de Pharmacie, No. X.* 15*ième Année, Octobre* 1809.

‡ *Vide* Mémoire sur la préparation et les propriétés de la salicine, par A. Buchner. *Journal de Pharmacie, No. IV.* 16*ième Année, Avril* 1830.

‖ The particular species is not named, but we have every reason to believe that salicine may be obtained from every individual species of the genus salix.

from 1 to 2 parts of sulphuric acid, weakened with water; immediately on shaking this mixture, a flaky precipitate separates, produced by the tannin; while the salicine is combined with the sulphuric acid: the liquor, which by this means acquires a straw colour, passes with facility, and perfectly clear, through a filter. To obtain the salicine without combination, we must separate the acid employed, by carbonate of barytes or of lime, a process which gives a red tint to the liquor: this, being separated from the precipitate, is immediately evaporated to the consistence of syrup, and afterwards treated by six to eight times its weight of alcohol, which determines the formation of a red, flaky deposit; it then only remains to filter and evaporate the liquor to obtain the salicine.

Salicine, when pure, is in the form of yellowish, shining, transparent, brittle, crystals; taste extremely bitter, resembling quinine; soluble in water in all proportions; also in alcohol, but insoluble in ether, and the essential oils.* We have no doubt but salicine may be used with advantage under many circumstances, as a substitute for quinine.

*Medical Properties and Uses.* The bark of this willow, and also that of the *salix fragilis* (crack willow)† and the *salix saprea* (round leaved sallow), have been given as a substitute for the *cinchona* barks, in the cure of intermittent and remittent fevers. The Rev. Mr. Stone, of Chipping-Norton, Oxfordshire, was the first who drew the attention of physicians to the bark of the *white willow;* he gave it successfully in doses of one drachm of the powder, every two, three, or four hours, between the paroxysms. In quartans, and a few obstinate cases, he occasionally added one-fifth of the Peruvian bark.‡ It has also been administered with success in cases of debility, and in other diseases, requiring the aid of bitter, astringent medicines. *Willow bark* may be given in decoction:—"An ounce and a half of the dried bark should be first macerated for six hours in two pounds of water, and then made to boil in it for ten or fifteen minutes. An ounce or two of this decoction may be given three or four times a day, or oftener."‖ For the cure of intermittents, the bark, in substance finely powdered, may be exhibited in doses of from one to two drachms.

* Journal de Pharmacie, No. iv. 1830. p. 247. † *Vide* vol.i. p. 19 of this Work.
‡ Phil. Trans. vol. liii. p. 195. ‖ Edin. New Dispens. 11th Ed.

# ORD. III. COMPOSITÆ DISCOIDEÆ.

## SOLIDAGO VIRGAUREA. COMMON GOLDEN-ROD.

*SYNONYMA.* Virga Aurea vulgaris latifolia. *Bauh. Hist. v.* 2. 1062. *f.* Virga aurea. *Raii Syn.* 176; *Camer. Epit.* 748, 749, *f. f.*; *Park.* 542; *Ger. Em.* 430. *f.*; *Matth. Valgr. v.* 2. 354. *f.*; *Dod. Pempt.* 142. *f.* Solidago, *n.* 69. *Hall Hist. v. t.* 29. Solidago virgaurea. *Lin. Sp. Pl.* 1235. *Hook. Scot.* 244; *Stokes, v.* 4. 219; *Fl. Brit.* 889; *Engl. Bot. t.* 301; *Engl. Fl. v.* 3. *p.* 438; *Hook. Br. Fl. p.* 362. Small, with broader radical leaves. *S. cambrica Huds.*; *Willd. v.* 3. 2065: *Wither. Arrang. of Brit. Pl. v.* 4; Solidago vulgaris. *Gray, Nat. Arr. of Brit. Pl. v.* 2. *p.* 465.

*Class* Syngenesia. *Ord.* Polygamia Superflua.

*Nat. Ord.* Compositæ, discoidiæ, *Linn.* Corymbifera, *Juss.*

*Gen. Char.* *Receptacle*, naked. *Seed*, downed, simple. *Calyx*, imbricated, with close scales. *Florets of the Radius*, about five (yellow.)

*Sp. Char. Stem* slightly zigzag, angular. *Clusters*, downy, panicled, crowded, erect. *Upper leaves*, lanceolate. *Lower leaves*, elliptico-lanceolate, hairy, partly serrated.

THE *Solidago Vigaurea* is the only species* of the genus that is indigenous to Britain.† It is a perennial plant, flowering in July and August; inha-

* Withering says that "these plants are so variable in size and other more proper characteristics, that it is difficult to determine species and varieties."

† The genus *solidago* comprises a very numerous tribe of plants; sixty-six are enumerated in Loudon's *Hortus Britannicus*, as being cultivated in our gardens, nearly the whole of which are natives of North America; though Sprengel confines the list of species to sixty-three.

*Solidago virgaurea.*

C. Sowerby del

biting groves and heaths, and flourishing in poor soils on mountainous situations. The *root* is woody, and furnished with long simple fibres; the *stem* rises from one to three feet in height, erect, slightly zigzag, angular, solid, downy, branched towards the top. The *leaves* are elliptic-oblong, stalked, more or less serrated, rough, clothed with a rigid down, of a dull green on the upper surface, paler beneath. The *stem-leaves* are smaller, more entire, sessile, alternate, downy, and gradually diminishing to lanceolate bracteas. The *flowers* are of a bright yellow colour, in terminal and axillary *panicles*, forming dense leafy clusters, which vary much in the number and size of the flowers; in elevated situations being more dense, shorter, and less compound. The *scales of the calyx* are erect, lanceolate, downy, membraneous at the edges, and finely fringed, within of a silvery whiteness.* The *florets of the disc* are numerous, tubular, with five equal segments: those of the ray from five to ten; elliptic-oblong, three-toothed, spreading; the *filaments* are capillary, short; the *anthers* united into a cylindrical tube; the *seeds* are ovate, hairy; their down appearing rough when magnified; the *receptacle* is punctated and toothed at the margin. Fig. (*a*) represents the lower part of the stem and leaves in outline: (*b*) the calyx: (*c*) a floret of the ray: (*d*) a floret of the disc: (*e*) the receptacle.

*Qualities, &c.* The whole herb, when slightly bruised, has a slight aromatic odour, and a weak astringent taste: these qualities are extracted both by water and alcohol: the watery infusion, made with boiling water, has a slight astringent taste, and strikes a black colour with the sulphate of iron. We have not learnt that this plant has been chemically examined; but from its slight astringency, it probably contains a small portion of the tannin principle.

*Medical Properties amd Uses.* This plant is astringent, tonic, and slightly diuretic: formerly it was much employed in calculous and other diseases of the bladder, and several cases are recorded† of its beneficial effects. Nevertheless it is seldom employed in modern practice: like many of our other indigenous plants, it is too common to be held in any esteem. Old Gerarde, when alluding to the high price this plant fetched, till it was discovered growing in the neighbourhood of London, when it ceased to be held in any estimation, observes—"This verifieth our English proverbe, 'Far fetcht and

* Withering. † See Gent. Mag. for 1788—and Med. and Phy. Journ. vol. 19.

deere bought, is best for the ladies.' Thus much I have spoken, to bring these new-fangled fellowes back again, to esteeme better of this admirable plant." Gerarde, no doubt, overrated the medicinal properties of this indigenous herb; but modern practitioners, probably, equally undervalue it. We feel convinced that many valuable native plants are discarded from our materiæ medicæ, to gratify the prevailing rage for exotic productions.

# ORD. IV. AGGREGATÆ.

## CEPHAELIS IPECACUANHA. IPECACUAN.

*SYNONYMA.* Ipecacuanha fusca. *Pïso, Bras. p.* 101. Herba Paris Brasiliana, Polycoccos. *Raii Hist.* 669. Callicocca ipecacuanha. *Brotero, Linn. Trans. v.* 6. *p.* 137. *t.* 11. Psychotria ipecacuanha. *Stokes, Bot. Mat. Med. v.* i. 364. Cephaëlis ipecacuanha. *Rich. Hist. Ip. p.* 21. *t.* 2. *Ræm. et Sch. Syst. Veg. v.* 1. *p.* 210. *St. Hil. Pl. Us. Brazil. v.* i. *t.* 6.

*Class* Pentandria. *Ord.* Monogynia.

*Nat. Ord.* Aggregatæ. *Linn.*—Rubiacæ. *Juss.* Cinchonaceæ, *Lindley.*

*Gen. Char.* *Flowers* in an involucred head. *Corolla* tubular. *Stïgma* two-parted. *Berry* two-seeded. *Receptacle* chaffy.

*Spec. Char.* *Stem* simple ascending, somewhat shrubby, sarmentose. *Leaves* ovate-lanceolate, somewhat pubescent. *Head of flowers* terminal, pedunculated, solitary. *Corolla* five-cleft, chaffy. *Bracteas* large. *Involucre* tetraphyllous.

THE *Cephaëlis Ipecacuanha* is a perennial plant, native of Brazil, and found in moist situations in the provinces of Rio Janeiro, Mariannia,

*Cephaelis ipecacuanha.*

C. Spratt del

Pernambuqua, Bahia, &c. inhabiting the woods, and flowering from November to March. The *root* is simple, or somewhat branched, and furnished with a few short *radicles;* it is roundish, three or four inches in length, and two or three lines in thickness, irregularly bent, externally of a brown colour, and annulated with numerous, prominent, unequal, rings. The *stem* is procumbent at the base, rising from five to nine inches in height, round, the thickness of a hen's quill; smooth, leafless, of a brownish colour, knotted at the lower part, and leafy towards the upper: after the first year it throws out a few knotty runners, from which, about six inches apart, new stems arise. The *inferior leaves* are caducous, so that not more than eight generally remain at the summit of each stem, when it flowers: they are nearly sessile, opposite, spreading, ovate, pointed at both ends, three or four inches long, and less than two broad; of a bright green on the upper surface, beneath of a whitish green colour, pubescent, veined; at the base of each pair of leaves, is a pair of short, fimbriated, withering, *stipules*, embracing the stem. The *flowers* are aggregated in a solitary head, on a round, downy *foot-stalk*, terminating the stem; somewhat drooping, and encompassed by a four-leaved *involucre.* The florets are sessile, from fifteen to twenty-four in number, interspersed with little *bracteas;* the *calyx* very small ,five-toothed, superior, and persistent; the *corolla* monopetalous; the border shorter than the tube, woolly about the throat, swelling upwards, and divided into five ovate, acute, spreading, segments. The *filaments* are short, capillary, inserted into the upper part of the tube, and bearing oblong, linear, erect, *anthers.* The *germen* is ovate, surmounted by a thread-shaped style, as long as the tube, surrounded at its base with a short, nectariferous rim, and terminated by two obtuse *stigmas*, the length of the anthers. The *fruit* is a one-celled berry, of a reddish purple colour, becoming wrinkled and black, and containing two smooth, oval *seeds.* Figure (*a*) represents a flower magnified: (*b*) the corolla spread open, to show the anthers: (*c*) the germen, style, and stigmas: (*d*) an interfloral bractea: (*e*) a berry: (*f*) section of a berry, shewing the seed.

Although the *root* of this plant* has been long employed as an emetic, and

* *Brown Ipecacuan* was first brought into Europe about the middle of the last century; but it is impossible to ascertain at what period this root was first known for its emetic effects in America. Piso published an account of it in 1618.

as otherwise forming a valuable remedial agent in our list of materia medica; yet the botanical characters of the plant itself were unknown, till Professor Brotero of Coïmbra, determined the genus to which it ought to be referred.* According to Decandolle, the term *Ipecacuanha*, in South America, implies vomiting-root, and therefore it is applied to the roots of very different plants, viz. *Asclepias currassavica*—*Cynanchum Ipecacuanha*—*Viola parviflora*—*V. Ipecacuanha*—*V. Calceolaria*—and *Cynanchum tomentosum*: and sometimes to the *Dorstenia brasiliensis*—*D. Arifolia*—and to the *Euphorbia ipecacuanha*.† Two varieties of the root are brought to this country, packed in bales from Rio Janeiro,—the *brown* and the *white*, but whether they be the roots of one and the same plant, or otherwise, does not appear to be exactly determined. According to Mutis, the former is the root of the *cephaëlis*, and the latter, on the authority of M. Gomez, we must suppose to be yielded by the *Richardsonia Brasiliensis*. There is also a third variety, called *black Ipecacuan*, which is a native of Peru, and is exported from Carthagena to Cadiz. It is the root of the *psychotria emetica*. It is fusiform, striated, articulated, but not annulated. *White Ipecacuan* is externally of a dirty white colour, and turns brownish by drying, is simple, or little blanched, five or six lines thick, three inches long or upwards, attenuated at the extremities, variously contorted, with transverse annular rugosities, but larger than those of the *brown Ipecacuan*, its bark is thick, white, internally softer than the *brown*, the woody part white, hard, and as fine as a thread. The *brown Ipecacuan* is characterized by being contorted, wrinkled, and unequal in thickness, having a thick bark, deeply fissured transversely, covering a very small, central, woody part, so as to give the idea of a number of rings strung upon a thread. Its colour varies with different shades of brown or grey.

*Sensible and Chemical Properties, &c.* The root of *Ipecacuan* is inodorous, unless when reduced to powder, in which state it has a faint and somewhat unpleasant smell. The taste is nauseous, bitter, and slightly acrid. Boiling water takes up eight parts in twenty, proof spirit about six and a half, and alcohol four parts. Various experiments have been instituted by chemists, to detect the particular constituent to which Ipecacuanha owes its emetic

* *Vide* Linnæan Trans. vol. vi.

† In St. Domingo, several species of *Ruellia*, which excite vomiting, are denominated *false Ipecacuan*. *Vide* Nouveau Dictionnaire d'Histoire Naturelle, Art. Ipecacuanha.

quality.* M. M. Pelletier and Magendie found that the *cephaëlis Ipecacuanha*, *Viola emetica*, and *Psychotira emetica*, contain a common principle, which they named *emetine;* to obtain which, they digested the powdered root in double its weight of ether, in order to separate any fatty matter; the remainder was heated with four times its weight of highly rectified alcohol, until it ceased to become coloured, even when aided by heat. The solution was evaporated to dryness, and re-dissolved in water, acetate of lead being dropped into the solution; the precipitate, which falls, is to be diffused through water, and exposed to a current of sulphuretted hydrogen gas. Sulphuret of lead falls to the bottom, and the *emetine* remains in solution. The solution being again evaporated to dryness, the *emetine* appears in the form of transparent scales of a reddish brown colour, nearly devoid of odour, and the taste is bitter, but not very nauseous. It is capable of supporting the heat of boiling water, without undergoing any change, is very deliquescent, soluble in water, and incrystallizable.

*Emetine*, as above prepared, is not quite pure. To obtain pure emetine, powder the ipecacuanha, and digest it in ether at sixty degrees, to dissolve the fatty, odorous, matter. When the powder yields nothing more to the ether, exhaust it again, by means of alcohol. Place the alcoholic tincture in a water-bath, and re-dissolve the residue in cold water: it thus loses a portion of wax, and a little of the fatty matter which still remained. Macerate it on calcined magnesia, by which it loses its gallic acid,—and re-dissolve it in alcohol. The *emetine*, thus isolated and rendered less soluble, is precipitated in combination with the excess of magnesia. This magnesian precipitate, after being washed by means of a little very cold water, to separate the colouring matter, which is not combined with the magnesia, must be carefully dried, and digested in alcohol, which dissolves the emetine. After the emetine has been separated from the alcohol by evaporation, it should be re-dissolved in a diluted acid, and blanched by digestion with purified animal charcoal: it must then be precipitated by a salifiable base.† Pure emetine is white, pulverulent, and unalterable by the air; although coloured emetine is deliquescent. It is scarcely soluble in water, but readily

* According to the analysis of M. M. Pelletier and Magendie, the components of ipecacuanha, are:—Oil, 2: Wax, 6: Gum, 10: Emetine, 16: Starch, 40: Wood, 20: Loss, 6=100.—*Annales de Chimie*, iv. 180.

† Magendie's Formulary.

dissolves in alcohol and ether: its taste is slightly bitter, it restores the blue of turnsole when reddened by an acid, and is soluble in all the acids, the acidity of which it diminishes, but without entirely destroying it. Like veratrine, it forms crystallizable saline compounds with acids. It may be precipitated from the combinations by the gall-nut, like the alkalies of the different species of *Cinchona*.

M. M. Pelletier and Dumas have found the composition of pure emetine obtained from the *Cephaëlis emetica*, to be as follows:—

| | |
|---|---|
| Carbon | 64,57 |
| Azote | 4,00 |
| Hydrogen | 7,77 |
| Oxygen | 22,95 |
| Emetine | 99,29 |

*Action of Emetine on the Animal System.* This substance, given to dogs and cats to the extent of from half a grain to two or three grains, produced vomiting, followed sometimes by long protracted sleep; but when administered to a greater extent, such as ten grains, it produced upon dogs continued vomiting, accompanied by stupor; in which, the animal, instead of recovering, as in the other case, commonly died in the course of twenty-four hours. On opening the body, the cause of death was discovered to be a violent inflammation of the pulmonary tissue, and of the mucous membrane of the intestinal canal, from the cardia to the anus,—phenomena very analogous to those resulting from emetic tartar. Similar effects are produced, if the emetine be injected into the jugular vein, or absorbed from any part of the body.

*Emetine* acts on man as it does on animals. In doses of two grains, taken on an empty stomach, it both vomits and purges, followed by a disposition to sleep. Sometimes half or a quarter of a grain will excite nausea and vomiting. In cases of disease, the action of emetine is perfectly analogous, in addition to which, however, it exerts beneficial effects on catarrhal affections, especially those of a chronic kind.*

* See Recherches Chimiques et Physiologiques sur l'Ipecac. par M. M. Magendie et Pelletier, Paris, 1807.

*Medical Properties and Uses of Emetine.* The cases in which *Emetine* may be employed, are the same as those in which *Ipecacuanha* is indicated.* To produce vomiting, four grains of the *impure* or *coloured emetine*, may be dissolved in two or three ounces of water or any other vehicle, and given in divided doses, repeated at short intervals; for if the whole be administered at once, the vomiting thereby excited, would probably expel it altogether from the stomach, without producing any other effect.

The following formula may also be used:—

EMETINE MIXTURE.

| | |
|---|---|
| Take of Emetine . . . . . | 4 grains |
| Weak Orange-flower infusion . . | 2 ounces |
| Syrup of Orange-flower . . . . . | ½ ounce. |

A dessert-spoonful to be given every half-hour.

In chronic pulmonary catarrhs, whooping-cough, obstinate diarrhœas, &c. the following lozenges may be advantageously substituted for the common Ipecacuanha lozenges.

PECTORAL LOZENGES OF EMETINE.

| | |
|---|---|
| Take of Sugar . . . . . | 4 ounces |
| Coloured Emetine . . . . . | 32 grains. |

Mix, and form into lozenges of nine grains each. These lozenges should be coloured with carmine, or other colouring matter, to distinguish them from similar preparations of Ipecacuanha. One of these lozenges may be given every hour; if repeated more frequently, they would excite nausea. Emetic lozenges may be prepared by using double the quantity of emetine, and only half the proportion of sugar. Nine grains of this preparation is commonly sufficient to make a child vomit, and three or four times the quantity will produce the same effect in adults.

The following formula may be substituted for the syrup of ipecacuanha.

SYRUP OF EMETINE.

| | |
|---|---|
| Take of simple syrup . . . . . | 1 pound |
| Coloured Emetine . . . . . | 16 grains. |

The action of pure emetine is similar to that of the coloured, but much

* For the medical properties and uses of *Ipecacuanha*, our readers will refer to the article *Ipecacuan*, in vol. iv. of this work.

more powerful. Two grains are sufficient to destroy a large dog. M. Magendie saw vomiting produced by one-sixteenth of a grain, in a man aged eighty-five: in whom, however, vomiting was readily excited.

M. Magendie recommends the following formula for the exhibitions of pure emetine:—

EMETIC DRAUGHT OF PURE EMETINE.

| | |
|---|---|
| Take of Infusion of Lime Flowers . . . | 3 ounces |
| Pure Emetine, dissolved in a sufficient quantity of nitric acid . . | 1 grain |
| Syrup of Marshmallows . . . . | 1 ounce.—Mix. |

Dose—a dessert-spoonful every quarter of an hour, until vomiting be produced.

The following syrup is also a convenient mode of exhibiting emetine.

SYRUP OF PURE EMETINE.

| | |
|---|---|
| Take of simple syrup . . . . . | 1 pound |
| Pure Emetine . . . . . | 4 grains.—Mix. |

Dose—one or two tea-spoonsful, according to circumstances.

M. Lerminier, of the Hospital *La Charité*, has frequently administered emetine in the form of lozenges; and, from his observations, he is enabled to a sert that ten or twenty grains of the root of ipecacuanha are adequately represented by one or two grains of emetine, (impure or coloured) so far as regards intensity of action. The convenient and agreeable form under which emetine may be administered, gives it a preference over ipecacuanha in substance.*

* *Vide* Clinique Médicale, &c. par M. Andral, Paris 1823.

*Cocculus palmatus.*

C. Sorat del.

# ORD. VIII. SARMENTACEÆ.

## COCCULUS PALMATUS. — PALMATED COCCULUS, OR CALUMBA PLANT.

*SYNONYMA.* Menispermum palmatum. *Willd. Sp. Pl.* iv. *p.* 825. *Lam. Dict.* iv. *p.* 99. *Spreng. Syst. Veg. v.* ii. *p.* 154. *Berry, in Asiat. Res. v.* x. *p.* 385. *t.* 5. Cocculus palmatus. *Curt. Bot. Mag. v.* iv. *N. S. t.* 2970-71 *Decand. Syst. Veg. v.* i. *p.* 522. *Ejusd. Prodr. v.* i. *p.* 98.

*Class* XX. Dioecia. *Ord.* VI. Hexandria.

*Nat. Ord.* Sarmentaceæ, *Linn.* Menispermeæ, *Juss.*

*Gen. Char.* *Sepals* and *petals* arranged in a double series, very rarely in a triple series. *Stamens* six, free, opposite to the petals. *Carpels* from three to six. *Fruit* drupaceous, reniform, rather compressed, one-seeded. *Cotyledons* distant.

*Spec. Char.* *Leaves* cordate, five to seven-lobed. *Lobes* entire, acuminate somewhat hairy on both sides. *Stem* and *germen* clothed with glandular hairs.

THIS species of *Cocculus* is a native of the eastern part of southern Africa; it has been ascertained to grow naturally, and in great abundance, from fifteen to twenty miles inland, in the thick forests about Oibo and Mosambique, on the Zanguebar coast. Formerly it was erroneously supposed, that the plant which produced the *calumba-root* of commerce, was a native of the island of Ceylon, and that its name was derived from Columbo, the principal town of that island. We are indebted to M. J. F. Fortin, a French gentle-

man, for the discovery of the true plant, which produces this valuable root; who, when at Mosambique, procured an entire offset, of a larger size than usual, (from the main root). This he brought with him to Madras in 1805, from which a male plant was raised in Dr. Anderson's garden; and from this individual, Dr. Berry's figure and description were made. The female plant had not been described at that period, but it was ascertained to belong to the natural order—*Menispermeæ*. The *root* is perennial, composed of a number of fasciculated, fusiform, somewhat branched, fleshy, curved, and descending *tubers*, of the thickness of an infant's arm, clothed with a thin, brown, epidermis, marked, towards the upper part especially, with transverse warts; internally they consist of a deep yellow, scentless, very bitter flesh, filled with numerous parallel, longitudinal fibres or vessels. The *stems* are annual, herbaceous, one or two proceeding from the same root, about the thickness of the little finger, twining, simple in the male plant, branched in the female, rounded, green; in the full grown plant, below thickly clothed with succulent longitudinal hairs, which are tipped with a gland. The *leaves* are alternate, the younger ones thin, pellucid, bright green, generally three-lobed; older ones remote, a span in breadth, nearly orbicular in their circumscription, deeply cordate, five to seven-lobed, the lobes entire, often deflexed, wavy on the surface and margin, dark green above, paler underneath, hairy on both sides, with prominent nerves, and supported on round, hairy, *foot-stalks*, about as long as the leaves.

In the *male* plant, the *racemes* are axillary, solitary, or two together, drooping, about as long as the petioles, compound, clothed with glandular hairs, and having at the base small deciduous *bracteas*. The *calyx* is smooth, consisting of six ovate, acute, nearly equal, leaves, arranged in a double series. The *corolla* is pale green; consisting of six oblong, free, *petals*, with involute margins, and recurved apices, arranged round a central, orbicular, disc or gland, in a single series. The *filaments* are six, thick, shorter than the petals, with terminal, truncated, four-celled *anthers;* the cells opening internally, and filled with linear, oblong grains of yellow *pollen*. In the *female* plant, the *racemes* are also axillary, solitary, simple, patent, shorter than those of the male. The *pedicels* are furnished with minute, caducous, *bracteas*. The *sepals*, or leaves of the calyx, are six, in two series; three inferior, smaller, ovate acute, subpatent, plane, glabrous. The *petals* are six, rarely eight, green, glabrous, shorter than the germens, and recurved at the

extremity. The *pistils* are three, free, of which two are generally abortive, ovate, acuminate, glanduloso-pilose, and containing one *ovule*. The *style* is very short, and the *stigma* has several spreading points. The *fruit* is drupaceous, or berried, about the size of a hazel nut, densely clothed with long spreading hairs, which, at their extremity, are tipped with a black gland. The *seed* is subreniform, clothed with a thin black shell, transversely striated.* Figure (*a*) the pistils, (*b*) a female flower, (*c*) a stamen and petal, (*d*) a male flower, (*e*) a seed.

*Calumba root* is the staple export of the Portuguese from Mosambique; and, from the quantity exported, it is not a little remarkable that its place of growth should have so long remained unknown, or doubtful to the rest of Europe. The roots are dug up in March, but the offsets only are taken. Soon after they are dug up, they are cut into slices, strung on cords, and hung up to dry in the shade; when they are sufficiently dry, they break short, and are then deemed good; but when they are soft, and of a dark colour, their quality is considered bad, and not marketable. The dried root is brought to this country, packed in bags or cases. It is in transverse sections, generally about one third of an inch in thickness and from one to two inches in diameter.†

"The late Sir Walter Farquhar was very anxious to introduce into England the *calumba-root* in a living state; and for that purpose, he desired his son, Sir Robert Farquhar, Governor of Mauritius, Bourbon, and their dependencies, to procure the plant from its native soil in Africa, and forward it to London. Sir Robert lost no time, after assuming his government at the conquest of the French Islands, in applying to the Governor of Mosambique for growing plants; and was repeatedly assured that these should be sent to him at the proper season. The promises, however, were never fulfilled; although renewed by the several succeeding officials of the Portuguese possessions on the East coast of Africa, ever since the year 1811. Dr. Wallich also took much pains for effecting the same object, and sent to Governor Farquhar the drawing made at Calcutta of a male plant of the

* The above description is transcribed from that published by Dr. Hooker in the Botanical Magazine for March 1830.

† We are told that the root of *white Bryony,* tinged with the tincture of calumba, has been not unfrequently substituted for this root.

*calumba-root*, which had been brought to the Botanic garden there by Mr. Berry. Copies of this drawing were distributed to the different ships of war, and captains of merchant vessels, trading to the eastern coast of Africa, that they might be enabled to distinguish the plant, and bring it to the Mauritius; since there had been an evident unwillingness on the part of the Portuguese authorities to permit this precious vegetable to be taken away in any other state than what it bears in commerce, when deprived of vegetative power by passing through the oven.

"All the attempts resulting from these means, proved fruitless; until Captain William Fitzwilliam Owen, commanding the surveying squadron of His Majesty's Navy, on the East African coast, undertook the task. The extensive influence he had acquired by his intercourse with the native chieftains and tribes, enabled him to procure living plants; while his botanical knowledge secured him against the mistakes committed by others, who had been misled by the local settlers in their search, and imposed on by the substitution of other species, instead of the true *Calumba root*. Captain Owen, in the year 1825, brought away, in His Majesty's ship Leven, from Oibo, a great number of cases, filled with growing roots of male and female plants, laid down in the sandy loam, which appears to be their favourite soil. No time was lost by him in forwarding a great portion of these to M. Telfair, at Mauritius, planting some also at Mahé, an island in the Seychelles Archipelago, and sending to Bombay several cases, in order to multiply by dispersion, the chances of success in naturalizing them in different climates.

"The roots that were brought to Mauritius, were partly transmitted to England, New Holland, and America; but the greater number were distributed among the various districts of Mauritius and Bourbon. Many of these plants blossomed at Mauritius in the course of a year, but the flowers all proved male. The roots, however, had, during that period, multiplied to twenty or thirty times the original quantity; and thus an opportunity was given for distributing them still more extensively. The female plants flowered at Seychelles, and Mr. G. Harrison, the Government agent there, transmitted some of these roots to Mr. Telfair, in whose garden of Bois Chéri in the Mauritius, they have flowered, and being fecundated by Professor Bojer, who touched them with the pollen of the male blossom; they bore seeds. From these individuals, the drawings by Professor Bojer have been taken, which give a delineation and dissection of every part."

*Sensible and Chemical Properties, &c.* *Calumba root* is bitter and slightly aromatic; it breaks with a starchy fracture, and is easily pulverised; externally, of a brown wrinkled appearance; internally, yellow. The woody part of the root should be of a light yellow colour, somewhat solid and heavy. Its smell is weak, with a slight aromatic odour. Boiling water takes up about one-third of its weight; the infusion has the sensible qualities of the root; it is not altered by sulphate of iron, nitrate of silver, corrosive sublimate, nor by emetic tartar; but it is copiously precipitated by acetate of lead, tincture of nutgalls, lime-water, and yellow cinchona bark. It gives out its properties also to alcohol and proof spirit; but the latter is the best menstruum. It affords an essential oil, by repeated distillation with water; the remaining decoction yields malate and sulphate of lime. M. Planché obtained from this root one-third its weight of starch; a yellow, bitter, resin; a small quantity of volatile oil; salts of lime and potass; oxide of iron; silex; and a large proportion of a substance, which resembled animal matter.* We are told that a spurious *calumba root* is met with in France, which is imported from the states of Barbary. It is known by its not containing starch; hence it is easily detected by the agency of iodine, which does not alter its colour; by its changing black with sulphate of iron, and by its infusion reddening turnsole paper.

*Medical Properties and Uses.* *Calumba root* is considered a powerful antiseptic and tonic, and also possessed of some astringent properties; thence it is recommended in diarrhœa,† cholera morbus, general debility, and in the last stages of phthisis pulmonalis, and in hectic fever; it has been found to check colloquitive diarrhœa, to allay nervous irritability, and to impart some degree of vigour to the stomach. It has also been considered useful in allaying the distressing nausea and vomiting which accompany pregnancy, and in the low stage of puerperal fever.‡ It is also an excellent remedy in dyspepsia. *Calumba root* may be given in powder in doses of from fifteen to thirty grains, and repeated once in four or six hours. It is

* Bull. de Pharm. iij. 289.

† By the natives of Mosambique, and also by those at a remote distance, this root is considered almost a specific for every disorder of long standing; but more especially for dysentery and venereal disorders.

‡ *Vide* Denman's Introduction to Midwifery, vol. ij. 524.

usually, however, taken in the form of infusion, either alone, or in combination with neutral or alkaline salts, aromatics or opiates, according as circumstances may indicate. Off. The Root. Off. pp. Infusum calumbæ, L.E. Tinct. Calumbæ. L. E. D.

# ORD. XIV. RUBIACEÆ.

## CINCHONA. PERUVIAN BARK.

*Class* Pentandria. *Ord.* Monogynia.

*Nat. Ord.* Rubiaceæ, *Juss.* Cinchonaceæ, *Lindley.*

THE entire genus of this valuable tribe of plants is indigenous to the New World; growing for the most part among mountainous regions, difficult of access, and in other respects affording but little encouragement to the scientific traveller. To this cause we may ascribe our comparative want of information respecting one of the most valuable remedies which the vegetable world has yet offered to mankind. Recent events, added to the valuable labours of pharmaceutical chemistry, and the present enterprise and improvement in that science, will, it is hoped, soon bring us better acquainted with the botanical characters of those species of *cinchona*, to which medicine is so much indebted. We believe the fact to be pretty well established, that there are many species of this tree, which yield a bark partaking more or less of the properties that distinguish the *peruvian bark* of commerce, although the distinctive characters of these species are still a desideratum in our botanical works. Ruiz and Pavon have described fifteen species,

*Cinchona Pelargidea.*

natives of Peru and Chili, and seven have been found by Mutis,* in the neighbourhood of Santa Fè. It is probable that very many more remain undescribed. The Edinburgh College formerly enumerated three *varieties* of the Peruvian, viz. the *common* or *pale bark*, the *red*, and the *yellow;* but it has been long since ascertained by the Spanish botanists, that these barks not only belong to distinct species, but that, probably, each of them is taken indiscriminately from several different species. The first of these is now generally referred to the *cinchona lancifolia* of Mutis; the second, to the *cinchona cordifolia* of the same botanist, (under which he includes the *cinchona purpurea* and *micrantha* of the *flora Peruviana*, and the *cinchona ovata* of Ruiz;) and the third to the *cinchona oblongifolia* of Mutis; the *magnifolia* of Ruiz and Pavon.

## CINCHONA LANCIFOLIA.†

THE *cinchona lancifolia*‡ grows to a great height and bulk, particularly before the great demand for the *cinchona bark* led to the destruction

* Mutis was a native of Cadiz, who went to Santa Fè in 1760, as physician to the Viceroy, Don Pedro Misia de la Cerda. He discovered the *Cinchona*, in the forests between Gauduas and Santa Fè, in 1772; although the credit of this discovery was attempted to be wrested from him by Don Sebastian Josè Lopez Ruiz; who, however, from his own documents, (transmitted by his brother to Baron Humboldt, to prove the priority of his discovery) appears to have known the *Cinchona* about Honda, only since 1774.

† We refrain from giving any synonyms under this species, because they are involved in such great obscurity. Lambert, in his *Illustrations of the Genus Cinchona*, published in London, 1821, considers the *Cinchona lancifolia* of Mutis, together with the *Cinchona lanceolata* of Ruiz and Pavon, *Cinchona nitida, Cinchona angustifolia,* and *Cinchona cucumæfolia (MSS.)* of the same authors, to be identical with the *Cinchona Officinalis* of Linnæus; and finally, as being the *Cinchona condaminea, Humb. & Bonpl. Pl. Æquinoct. v.* i. *p.* 43. *t.* 10. under which name Mr. Lambert adduces the following specific character:—Cinchona *Condaminea.* Leaves ovato-lanceolate, acute, glabrous, and as well as the branchlets, very shining; panicle brachiate, much branched, and smooth; calycine teeth, ovate acuminate; segments of the corolla linear-lanceolate; stigma emarginate; capsules ovate, ribbed.

‡ The bark of this species was formerly described under the vague name of *Cinchona officinalis.*

of so many full-grown trees, by stripping them of their bark; after which, it is said, they always die.* It is chiefly found in the neighbourhood of the village Ayavaca, in the woods of Caxanuma, Uritusinga, Monge, and Villonaco. This species of *cinchona* usually grows singly; whereas most of the others are usually found in groups. This handsome *tree* rises to the height of thirty or forty feet; its *trunk* is erect, and measures from fifteen to twenty inches in diameter, and is covered with a rough, blackish-brown, or ash-coloured *bark*, which exudes when wounded, a yellow, astringent juice: the *branches* are round, in opposite pairs, erect, brachiated, the younger ones obscurely quadrangular at the joints: the *leaves* are about four inches long, ovate, lanceolate, of a bright shining green, having a little depressed gland in the axils of the nerves on the under side, which is filled with an astringent aqueous fluid, having its orifice shut with hairs; they stand on *footstalks*, about one-sixth of their length, flat above, convex below, and of a purple colour :† the *stipules* are two,—supra-axillary, acute, silky, contiguous, and caducous: the flowers are odorous, of a very pale rose-colour, and furnished with small bracteas; they are produced in terminal, brachiated, trichotomous, leafy, *panicles*, supported upon round *peduncles* and *pedicels*, which are powdered and silky: the *calyx* is of a globular bell-shape, five-toothed, powdered and silky, like the peduncles, with the teeth very short, ovate, acute, contiguous, and purplish: the *corolla* is somewhat salver-shaped, with linear, lanceolate segments, much shorter than the tube: the *anthers* are twice the length of the free portion of the filaments, and the free parts are two-thirds shorter than the adherent :‡ the *germen* is globular: the *capsule* woody, ovate, longitudinally ten-striated, two-celled, many-seeded, oppositely twice furrowed, opening from the apex to the base with two valves, and crowned with the permanent calyx.‖

* Condamine however asserts, that the young trees do not die by losing their bark, but send out fresh shoots from the base.

† The leaf is said to vary in form, according to the altitude at which the tree grows; particularly before it comes into blossom.

‡ Humboldt.

‖ This species of *Cinchona* will be found figured under the name of *Cinchona officinalis*, in vol. ij. *t*. 91. of this Work.

*Cyclocma cordifolia.*

G. Spratt del.

## CINCHONA CORDIFOLIA.*

The *cinchona cordifolia* is a native of Peru, where it grows in great abundance, on a long chain of mountains that extend to the north and south of Loxa. The soil in which it thrives best, is generally a red clay or rocky ground, and particularly on the banks of small rivers, descending from the mountains,† flowering from May to September.

The *stem* is of no great thickness, erect, round, and covered with a smooth *bark*, externally of a brown grey colour; the *branches* are spreading, the younger ones quadrangular, smooth, leafy, sulcated, and tomentose; the *leaves* are opposite, spreading, about nine inches long, entire, and varying much in form, being oblong, ovate, or cordate; of a shining green on their upper surface, ribbed and pubescent underneath, and standing upon purplish *footstalks*, which are plain on one side, and roundish on the other: the *flowers* are produced in terminal, leafy, *panicles*, supported on long tetragonous flattish *peduncles:* the *calyx* is of a dull purple colour, downy, and five-toothed: the *corolla* is internally tomentose, white above and purplish below; its segments spreading with reflected lips; the *tube* of a pale red colour: the *filaments* are short, and support linear, bifid *anthers*: the *germen* is tomentose: the *capsule* narrow, oblong, about an inch and a half in length, of a reddish-brown colour, and crowned with the permanent calyx. Fig. (*a*) the corolla spread open: (*b*) the calyx and style: (*c*) an anther: (*d*) the style and stigmas. Our figure was copied from that given in the Flor. Peruv. tom. ij. 52. t. 193.

* If this plant be the *Cinchona cordifolia* of Mutis, and of Mr. Lambert, the following is the specific character given by the latter author:—

*Cinchona cordifolia.* Leaves roundish ovate, acute, heart-shaped, or attenuated at the base; beneath, as well as the branches, somewhat hairy; above, glabrous and shining; panicle brachiate, diffuse, pubescent; calycine teeth broadly rounded, mucronulate; stigma two-lobed; capsules oblong-ovate, cylindrical, without ribs.

Mr. Lambert considers this to be the true *cordifolia* of Mutis, MSS. of *Rohde, Monogr. p.* 58. *Humb. Nov. Gen. v.* iii. *p.* 401. (but excluding the synonyms there adduced, of the *Flora Peruv. Linn. Vahl. & Lambert*).

† Phil. Trans. vol. xl. p. 83.

## CINCHONA OBLONGIFOLIA.*

This *tree* rises to a considerable height; its *stem* is (single?) round, and erect, with a smooth, brownish, or ash-coloured *bark*; the older *branches* are smooth, round, and of a rusty colour; the *younger* ones obtusely quadrangular, leafy, and of a reddish colour; the *leaves*, when full-grown, from one to two feet long, of an oblong-oval shape, and stand opposite, supported on semi-round petioles of a purple colour; the *stipules* are supra-axillary, interfoliaceous, opposite, contiguous, united at the base, and of an obovate figure; the *flowers* are produced in large, erect, compound, terminal, *panicles*, and placed upon long, brachiated, many-flowered *peduncles;* the *calyx* is small, five-toothed, and of a purple colour; the *corolla* white, and odorous; the *filaments* are very short, inserted into the tube of the corolla; *anthers* oblong, bifid at the base, and situated below the middle of the tube of the corolla; the *capsules* large, oblong, obscurely striated, somewhat curved, and crowned by the calyx.† This tree is found on the Andes, growing in woods, on the banks of mountain streams, and particularly abundant at Chinchao, Riobamba, and Cuchero, flowering in June and July. Figure (*a*) the corolla, spread open, shewing the anthers, (*b*) the pistil, (*c*) the calyx.‡

*Chemical Properties.* The recent discoveries of the French chemists, MM. Caventou and Pelletier supersede all the previous researches, so far as medicine is concerned, into the nature of the *cinchonas*. Vauquelin ascertained that there were three, if not four, classes of *cinchona-bark*, differing essentially in their chemical constitution. The first class precipitates astrin-

* The *Cinchona oblongifolia* is thus characterized by Mr. Lambert:—

*Cinchona oblongifolia.* Leaves oblong or cordate; on both sides, as well as the branchlets, rough with dense hairs; panicle between brachiate and corymbose, rough with hairs; segments of the hairy corolla linear, stamens and style included; anthers thrice the length of the filaments; stigma bipartite; capsules ovate.

To this Mr. Lambert refers *Cinchona oblongifolia* of *Mutis, MSS. Humb. in Magaz. Rohde, Monogr. Humb. Nov., Gen. p.* 401. (excluding the synonyms of *Fl. Peruv. & Ruiz. Quinolog.*)

† *Flora Peruvian,* ij. 33—196.

‡ For our figure and description we are indebted to *t.* ii. of the *Fl. Peruv.*

gents, but not gelatine; the second precipitates gelatine, but not astringents; the third precipitates both gelatine and astringents; and lastly, there are some barks which precipitate neither gelatine nor astringents: but these he did not consider as properly belonging to the genus *cinchona.* Each of the three first classes was thought capable of curing intermittents.

It had been long a desideratum among pharmaceutical chemists to discover in the barks the particular substance to which the febrifuge property might be ascribed; and in pursuit of this object, MM. Laubert of Paris, Strenss of Moscow, and Gomez of Lisbon, published, about the same time, the result of their observation; unfortunately, however, they did not agree in their conclusions. The French chemists were more successful; they obtained a substance, which they recognized as that to which M. Gomez had given the name of *cinchonine*, and they further discovered that it was an alkaline.

The *cinchonine* was obtained by operating on the *cinchona condaminea*,* or *Grey-bark* of the French botanists. The *cinchona cordifolia*, (the *cinchona officinalis* of our Colleges, the *yellow-bark* of the French) was next subjected to analysis,† and from this was obtained an alkali, in many points resembling the *cinchonine*, but still differing in many important ones, sufficiently to prevent their being confounded: this new alkali was called *Quinine.* The examination of the *red-bark (cinchona oblongifolia)* followed;‡ and "it was an interesting question," says M. Magendie, "to determine whether this species,

* According to the analysis of MM. Caventou and Pelletier, the *Cinchona Condaminea* yield the following constituents:—1 cinchonine united with Kinic acid (the cinchonine forming 0,2 per cent. of the whole bark); 2 green fatty matter; 3 red colouring matter, very sparingly soluble; 4 red colouring matter, soluble (tannin); 5 yellow colouring matter; 6 Kinate of lime; 7 gum; 8 fecula; and 9 ligneous fibre.

† The *Cinchona cordifolia* yielded, according to M. M. Pelletier and Caventou:—1 yellow, odorous, adipocire; 2 yellow colouring matter; 3 tannin, which turns iron of a green colour; 4 red of cinchona, more abundant than in the red bark; 5 Kinate of *quinine*, with very little *cinchonine* (the quinine forming 0,9 per cent. of the bark, but according to Voreton, 1,4); 6 fecula; 7 woody fibre; and 8 Kinate of lime.

‡ The *Cinchona oblongifolia* consists of:—1 adipocire; 2 yellow colouring matter 3 tannin; 4 red of cinchona, in a large proportion; 5 Kinates of *cinchonine* and quinine (100 parts of the bark yielding 0,8 of cinchonine, and 1,7 of quinine); 6 fecula; 7 woody fibre; 8 Kinate of lime. Magendie, Formulaire. 4th Ed.

considered by many medical men as eminently febrifuge, contained *quinine*, *cinchonine*, or a third variety of alkali. The result was, that they obtained, not only a treble quantity of *cinchonine*, (in all respects like that obtained from the *grey-bark)* but also nearly twice as much *quinine* as the same quantity of yellow-bark had yielded. From ulterior experiments, made on large masses, it appears that *quinine* and *cinchonine* exist in all three species of bark, but the cinchonine is in greater quantity than the quinine in the *grey-bark* ,whilst in the *yellow-bark*, the quinine greatly predominates."*

The mode of obtaining the *quinine* and *cinchonine* is thus given by Magendie :—" Boil the bark in alcohol, until it loses all its bitterness ; evaporate the decoction to dryness in a water bath ; dissolve the extract thus obtained in boiling water, strongly acidulated with hydrochloric acid ;† add an excess of calcined magnesia ; which, after boiling a few minutes, fixes the red colouring matter, and leaves the liquid clear : when cold, filtrate, and wash the magnesian precipitate with cold water, dry it on a stone, separate all the bitterness by repeated digestion in boiling alcohol, mix the alcoholic liquors, and the *cinchonine* will crystallize as the fluid cools."‡

The *cinchonine* and *quinine* may be obtained by one operation, as follows. Having obtained the *sulphate of quinine* by the above process (operating on the *cinchona cordifolia)* decompose the mother waters, and the washings of that operation, (which hold in solution the sulphate of cinchonine) by magnesia or lime ; dissolve the quinine and cinchonine contained in these liquors, by digesting the magnesian precipitate when washed and well dried, in boiling alcohol: if the spirit be sufficiently charged, the cinchonine which predominates will crystallize; if it do not, further concentration is necessary. The cinchonine thus obtained, must undergo a re-crystallization to purify it; this is done by dissolving it in a sufficient quantity of boiling alcohol. The following process of M. Henry, Jun. for obtaining the *sulphate of quinine*, is much more cheap and expeditious. He digests the bark repeatedly in hot water, acidulated by sulphuric acid, blanches the liquors by means of hot lime, and washes the precipitate to separate the excess of lime ; this precipitate he repeatedly digests, when well drained, in alcohol at 36° (837); he

* Magendie, Formulaire.

† Muriatic acid of former chemists.

‡ M. Magendie here speaks of the grey-bark, *Cinchona condaminea ;* for if the *Cinchona cordifolia* be subjected to the same process, quinine is obtained, or rather, the sulphate of quinine.

then obtains, by distillation, a brown viscid matter, which becomes brittle when cold, and is very bitter; this matter he digests in hot water, acidulated by sulphuric acid; and the liquor, when cold, gives pure sulphate of quinine, in the form of perfect white crystals. These crystals are soluble in boiling water, especially if it be weakly acidulated; they are but little soluble in cold water, without the addition of an acid. We are told by Dr. Paris, that five or six drachms of the sulphate* may be obtained from two pounds of bark, by boiling it for half an hour, in sixteen pints of distilled water, acidulated with two fluid ounces of sulphuric acid. The quantity of lime necessary to be used is half a pound, or sufficient to render the solution of a dark brown, and to produce a reddish brown precipitate.†

*Chemical Properties of Cinchonine and Quinine. Cinchonine* is white, translucent, crystallizable in needles, and soluble only in seven hundred parts of cold water. If dissolved in alcohol or an acid, its taste is powerfully bitter, and resembles that of the *grey-bark*. It is dissolved in very small quantities by the fixed or volatile oils, and sulphuric ether. With acids it forms salts which are more or less soluble. According to the analysis of Mr. Brande, cinchonine consists of about—

| | |
|---|---|
| Carbon | 80,20 |
| Nitrogen | 12,65 |
| Hydrogen | 6,85 |
| | 99,90 |

*Quinine* is white, incrystallizable;‡ it is as little soluble in water as cinchonine, much more bitter to the taste, as are also most of its salts, which

* Eight grains of which are equal to an ounce of bark.

† M. Robiquet, by adopting a somewhat different mode of proceeding, obtained a sulphate of quinine, the characters of which are different from those we have described. He obtained a sulphate, in solid transparent prisms, of a flattened, quadrangular form, and soluble even in cold water: by comparative trials he found also, that this difference arose from the prismatic sulphate being acid, and the other alkaline. He is satisfied of the stability of the characteristics; for the salts preserve them without alteration after several crystallizations, although the sub-sulphate lost each time a small portion of its acid.

‡ MM. Pelletier and Dumas have succeeded in giving to quinine a crystalline form by bringing it to a state of fusion in *vacuo*, and allowing it to cool in a slow manner. Under this treatment, instead of preserving its resinous aspect and transparency, it contracts, becomes opaque, and forms at its surface centres of crystallization, which radiate on all sides; the fracture of the mass is crystalline.

are distinguished by a pearly appearance. It is very soluble in ether, while cinchonine is very little so; this difference serves as well to distinguish their bases, as to separate them when united. Quinine likewise differs from cinchonine in containing oxygen, and that in nearly as large a proportion as hydrogen. According to Mr. Brande, its ultimate components are nearly as follows:—

| | |
|---|---|
| Carbon | 73,80 |
| Nitrogen | 13 |
| Hydrogen | 7,65 |
| Oxygen | 5,55 |
| | 100, 0 |

Quinine, when melted, becomes idio-electric, and acquires the resinous electricity with much intensity when rubbed with a piece of cloth.

M. Robiquet, in the Journal of Science, has given an analysis of the two sulphates of quinine, but he found that the sub-sulphate lost a portion of its acid during each crystallization; he has given the composition of this salt, both after the first and third crystallization, as follows:—

100 parts of acid sulphate of quinine contain—

| | |
|---|---|
| Acid | 19,1 |
| Quinine | 63,5 |
| | 82,6 |

100 parts of sub-sulphate, first crystallization, contain—

| | |
|---|---|
| Acid | 11,3 |
| Quinine | 79,0 |
| | 90,3 |

The *sulphate of Quinine*, when exposed to the temperature of 100° (212° Fah.) becomes luminous, especially when subjected to slight friction. This remarkable property was first remarked by M. Callaud d'Annecy. "MM. Dumas and Pelletier exposed about two or three ounces of the sulphate, enclosed in a glass flask, which they kept in a sand-bath for half an hour, to the temperature of boiling water, when it exhibited, on friction, a tolerably intense white light. On passing through the cork of the flask a metallic rod, ending in a point at the internal extremity, and by a ball at the opposite one, and applying it to the ball of the rod by a voltaic electroscope, shaking the flask before each contact, these gentlemen obtained the greatest se-

paration of which the rods of the electroscope are susceptible: the electricity was always vitreous. The *sulphate of cinchonine* possesses the same phosphorescent property, but in a less degree, and the electric faculty in the same ratio."*

*The Medical Properties and Uses of Peruvian Bark* will be found under the article *cinchona officinalis*, in Vol. II. of this Work. We have, therefore, only to notice in this place the medical properties and formularies for the exhibition of the *cinchonine* and *quinine*. M. Magendie says—"A sufficient number of cases induce me to believe that these two alkalies (cinchonine and quinine) possess the medical properties of the *cinchonas*, and may be substituted for them on all occasions." In the twelfth volume of the Medico-Chirurgical Transactions, Dr. Elliotson has sufficiently established the febrifuge efficacy of both simple quinine, and of the sulphate, which is further confirmed by Dr. Dickson of Clifton, in the Edinburgh Medical and Surgical Journal for October 1823. But indeed it is needless now to insist upon the value of these preparations; since, in the ague counties of England, their use is become general, and seldom fails to effect a cure. As a general tonic, both the *cinchonine* and *quinine* may be successfully exhibited, in all cases wherein the *cinchona* would be indicated. M. Magendie says—"The sulphates are the preparations most commonly employed;" and he recommends "from one to eight grains to be given in the twenty-four hours.† Some physicians," he adds, "have thought it necessary to carry the dose much higher, but in general the result has not answered their expectations, and several patients have experienced severe symptoms, such as great agitation, with strong cerebral excitement."‡

*Cinchonine* is thought to possess the febrifuge properties in a less degree than *quinine;* the sulphate of the latter is the preparation now generally employed in England, and the following seems to be the best mode of exhibiting it. Dissolve the sulphate in a little lemon-juice, and then add a sufficient quantity of pure water, or of cinnamon or peppermint water, to make a draught. In this way two grains may be given for a dose, and repeated three or four times a day. The following formularies for the exhibition of

* Appendix to Formulary, by R. Dunglison, p. 25.

† According to Paris, eight grains of the sulphate is equal to one oz. of bark.

‡ In large doses it often occasions severe nausea.

the *cinchonine* and *quinine*, are given by M. Magendie, as adopted by the French apothecaries.—

TINCTURE OF QUININE.

Take of sulphate of Quinine . . . . . 6 grs. (gr. 4. 92 troy.)
Alcohol of 34° (847) . . . . . 1 oz. (7 dr. 52. 5 gr. troy.)

We are told that the sulphate is to be preferred to the pure quinine, in this case; because, when the tincture is made by using alkali not saturated by an acid, a precipitate is formed on adding it to aqueous liquors.

WINE OF QUININE.

Take of good Madeira Wine* . . . 1 litre (oz. 22. 104 troy.)
Sulphate of Quinine . . . 12 grains (gr. 9. 84 troy.)

SYRUP OF QUININE.

Take of simple syrup . . . . 2 pounds (31 oz. 4 dr. 2 gr. troy.)
Sulphate of Quinine . . 64 grains (gr. 52. 48 troy.)

M. Magendie has proposed the following formulæ for the exhibition of Cinchonine:—

SYRUP OF CINCHONINE.

Take of simple syrup . . . . 1 pound (15 oz. 6 dr. 1 gr. troy.)
Sulphate of Cinchonine . 48 grains (gr. 39. 36 troy.)

TINCTURE OF CINCHONINE.

Take of sulphate of Cinchonine . . 9 grains (gr. 7. 383 troy.)
Alcohol at 34° (847) . . . 1 ounce (7 dr. 52. 5 gr. troy.)

WINE OF CINCHONINE.

Take of Madeira Wine . . . . . 1 litre (oz. 31. 104 troy.)
Sulphate of Cinchonine . . 18 grains (gr. 14. 76. troy.)

The above preparations of *cinchonine* may be given in equal doses, and under the same circumstances with the preparations of *quinine*.

* Any other white wine may be substituted.

*Pyrola umbellata.*

C. Spratt del

# ORD. XVII. BICORNES.

## PYROLA UMBELLATA. UMBEL-FLOWERED WINTER-GREEN.

*SYNONYMA.* Pyrola 3 fruticans. *Clus. Stirp. Pann.* 507. *Hist. p.* 117. Chimaph. umbellata. *Brown in Herb. Banks.* Pyrola fruticans arbuti folio. *C. Bauh. Pin.* 191; *Tournef. Inst.* 256; *Moris. Hist.* 3. *sect.* 12. *t.* 10. *f.* 5. Pyrola folio arbuti. *Riv. Pent. t.* 139. *f.* 2. Chimaphila umbellata. *Bart. Veg. Mat. Med. U.S. v. l. t.* 1. 17. Pyrola umbellata. *Lin. Sp. Pl. p.* 568; *Willd.* 2. *p.* 622; *Pollich. Palat. n.* 389; *Hoffm. Germ.* 144; *Krocker Siles.* 2. *p.* 14; *Roth. Germ. l.* 151. *v.* 2. 464; *Lam. Encycl.* 5. *p.* 744; *Persoon. Synop. l.* 483; *Mich. Amer. l. p.* 251; *Bigel. Med. Bot. t.* xxi. *Bot. Mag. t.* 778. Chimaphila corymbosa. *Pursh. Amer. Sept.* 1. *p.* 300.

*Class* X. Decandria. *Ord.* I. Monogynia.

*Nat. Ord.* Bicornes, *Linn.* Ericeæ, *Juss.* Monotropeæ, *Nuttall.*

*Gen. Char.* *Calyx* in five deep segments. *Petals*, five. *Capsule*, superior, five-celled, bursting at the angles. *Anthers*, opening by two pores.

*Sp. Char.* *Leaves*, wedge-shaped, lanceolate, serrated. *Flowers*, somewhat umbellate. *Stamens*, smooth. *Style*, immersed.

THIS beautiful species of *winter-green* is a native of the United States of America, and is also to be met with in many parts of the north of Europe and Asia. It is chiefly found growing in shady woods, where it is protected from the solar rays, and nourished by a soil formed from the decomposition of leaves and other vegetable matter. In the northern parts of America.

where it is a very common plant, it is known under several appellations, viz. *ground holly*, *winter-green*, *pippissewa*; and by the native Indians, *Herbe de Paigne*. In Canada, it is known by the name of *L'Herbe à Pisse*. The genus *Pyrola* comprises about fifteen species, of which five are indigenous to Britain.* The *Pyrola umbellata* was introduced into this country about fifty years ago; but it is only within the last few years that it has excited the attention of the profession as a remedial agent. We are told by Mr. Don that in "the temperate zones the various species of *Pyrola* are chiefly met with in mountainous situations; some of them, such as *uniflora* and *secunda*,† extending to considerable elevations. In the frigid zones, on the contrary, they are only to be found in the lowest and narrowest plains, adjacent to the sea, and are never met with in those regions, beyond the limits of trees. Most of the species extend across the continents of Asia, Europe, and America. There are specimens of *secunda* and *uniflora* in the Banksian Herbarium, from the islands on the north-west coast of America. The *Pyrola picta* of Smith is found on the north-west coast of America, and in mountainous situations in Japan. Some species, however, are of more limited diffusion: thus, *Pyrola asarifolia*, *maculata*, and *elliptica*, have only been detected in North America. The *Pyrola dentata*, *Menziesii*, and *occidentalis* are still more confined, being only found in particular districts."‡

The *root* of the *Pyrola umbellata* is perennial, creeping, and long, sending up at various distances several woody, somewhat angular, erect, or slightly procumbent *stems*, which rise about a span in height: the *leaves* are produced in irregular whorls, of which there are mostly two or three on each stem; they are wedge-shaped, lanceolate, serrated, smooth, supported upon short *petioles*, and are of a deep shining green. The *inflorescence* consists of a small *corymb*, generally of five *flowers*, on simple, nodding *pedicells*: the *calyx* is inferior, and consists of five roundish, permanent segments, much shorter than the corolla; the *petals* are five, roundish, concave, spreading, of a cream colour, with a tinge of crimson at the base: the ten *filaments* are awl-shaped, curved, and supporting large two-celled *anthers*, of a purple colour; each cell opening by a short, round, tubular orifice, at the summit: the *style* is cylindrical, half the length of the *germen*, and concealed by the

* See Smith's English Flora. † Both these are natives of Britain—*Smith*.

‡ *Vide* Monograph of the Genus *Pyrola*, in the Memoirs of the Wernerian Natural History Society, by D. Don, Lib. Lin. Soc.

*stigma*, which is large, peltate, covered with a viscid matter, and obscurely five-rayed. The *capsules* are orbicular, depressed, with five valves, and five cells, and five partitions, from the central column: the *seeds* are very minute, of an oval figure, each contained in a membranous tunic, elongated at both ends. Fig. (*a*) the seed; (*b*) the anthers.

*Sensible and Chemical Properties.* The whole plant has a moderately warm pungent taste, somewhat between bitter and sweet: when bruised, it exhales a strong, and rather unpleasant odour. Both water and alcohol extract its virtues, but the latter most completely. The watery infusion of the dried plant is of a brownish colour; the decoction is of a deeper colour, and both strike a black with the sulphate of iron. According to the experiments of Dr. Wolf,* 100 parts of *Pyrola umbellata* contain about 18 of a bitter extractive principle, 2,04 of resin, 1,38 of tannin, a slight portion of gum; the rest, fibrous matter and earthy salts. The resin is adhesive, brownish, readily soluble in ether and alkalies, burning with flame and a resinous odour, and leaving a white cinder.

*Medical Properties and Uses.* The *Pyrola umbellata* is diuretic and tonic; externally stimulant. It has lately been introduced into practice as an efficacious diuretic in dropsy, and from the favourable testimonies of physicians who rank high in their profession, we are warranted in recommending it to general practice, as a remedial agent, possessing very considerable diuretic and tonic powers. The diuretic properties of the *Pyrola umbellata* seem to have been fully illustrated by Dr. W. Somerville, in a paper on this vegetable published in the fifth volume of the London Medico-Chirurgical Transactions. The facts presented by this physician afford satisfactory evidence of the power of this medicine to promote the urinal excretion, and to afford relief to patients afflicted with dropsy in its various forms. The most distinguished case presented by him is that of Sir James Craig, the British Governor of Canada, who was labouring under general dropsy, which, in its progress, had assumed the forms of hydrothorax, anasarca, and ascites, and which was combined with different organic diseases, especially of the liver. After having tried, with little or temporary success, almost every variety of diuretic and cathartic medicines, and submitted twice to the operation of tapping, the patient had recourse to a strong infusion of *Pyrola*,

* See a Dissertation, "*De Pyrola umbellata*," published at Gottingen, in 1817.

in the quantity of a pint every twenty-four hours. Although the case was altogether an unpromising one, yet the plant gave relief, not only in the first, but also in the subsequent instances of its use. It increased the urinal discharge, and, at the same time, produced an augmentation of strength, and an invigorated appetite. Several other cases of dropsy are detailed in Dr. Somerville's paper, in which the *Pyrola* was administered by himself and by other practitioners with decided advantage. Dr. Somerville found his patients remark that an agreeable sensation was perceived in the stomach soon after taking the *Pyrola*, and that this was followed in some instances by an extraordinary increase of appetite. He considers it as having, in this respect, a great advantage over other diuretics, none of which are agreeable to the stomach, and most of them very offensive to it. He further states, that no circumstance had occurred within his own experience or information, to forbid its use in any form, or to limit the dose. Sir Walter Farquhar, it appears, also used the *Pyrola umbellata* in the case of a lady labouring under ascites, in which case the diuretic effects were very striking. Dr. Barton, author of "The Vegetable Materia Medica of the United States," also corroborates the accounts of the diuretic effects of this vegetable, by four cases which came under his care at the Marines' Hospital, Philadelphia, in which a strong infusion was given with the most decided advantage.* Drs. Satterley and Marcet are also among those who have added their observations to the testimonies in its favour. Dr. Wolf has given one very satisfactory case of the utility of the *Pyrola* in ascites: he also found it to alleviate altogether the ardor urinæ attendant on gonorrhœa. Dr. Bigelow says: "I have administered this plant on various occasions, and attended to its mode of operation. In a number of dropsical cases, when first given, it made a distinct and evident impression on the disease, communicating an increased activity to the absorbents, followed by a great augmentation of the excretion from the kidnies. The benefit, however, with me, has been most frequently temporary, and it was found better to omit the medicine for a time, and to resume it afresh, than to continue it until the system had become insensible to its stimulus. After suspending it for

* The *Pyrola umbellata* appears to act on animals the same as on man; for it is said to be the practice in many parts of America to give a bucketfull of the decoction to horses that are unable to stale, with the view, and uniformly with the effect, of relieving them.

a week or two, the same distinct operation took place on returning to its use, as had been manifested in the first instance. It proved, in almost every case, a very acceptable medicine to the patient, and was preferred both for its sensible qualities and its effects on the stomach, to other diuretics and alteratives which had been prescribed. As a tonic, the *Pyrola umbellata* has been employed in intermittents, scrofula, and other diseases where this class of remedies are indicated. Dr. Mitchell, an American physician, relates some cases of its success in those fevers. In one of them, the urine, which was considerably increased in quantity, was of a dark brown colour. Dr. Heberden has recorded a case of a similar colour being produced by the *uva ursi.* We are told, the Indians administer a strong and warm decoction of this plant in rheumatism and fever: they employ the whole plant, and take it in large quantities. As an external remedy, it has been used as a cataplasm, and with apparent success in various chronic indurated swellings. It acts as a topical stimulant, and, when long continued, we are told, it often vesicates. Tumours of long-standing, have, in several instances, disappeared under its use. It has also been employed in the form of fomentation to ill-conditioned ulcers, and with good effects.*

The Dublin College directs the following method of preparing the decoction of *Pyrola* as recommended by Dr. Somerville.

| | |
|---|---|
| ℞ Pyrolæ umbellatæ . . . . . | ℥i |
| Aquæ mensura . . . . . | lbij |

Macerate for six hours, then bruise and return the *Pyrola* to the liquor, and reduce the mixture by evaporation, when strained and expressed to lbj by measure. Dose from one ounce to three, three or four times a day.

* Another species of the genus *Pyrola,* the *Pyrola rotundifolia,* is said to be used by Indians in North America, as a topical stimulant, and vesicant. And Mr. Pursh says of the nearly-allied *Pyrola,* (Chimaphila) *maculata,* that it is held in high esteem for its medicinal properties by the native Canadians, who call it *sip-si-seua.* He has himself witnessed a successful cure, effected by a decoction of this plant, in a very serious case of hysterics. According to Dr. Torrey, the *Pyrola umbellata* is also called *pip-si-sewa,* or *sip-si-sewa.* In all probability the properties of the two species of Chimaphile are identical.

# ORD. XX. PERSONATÆ.

## SCROPHULARIA NODOSA. KNOBBY-ROOTED FIGWORT.

*SYNONYMA.* Scrophularia. *Matt.* 1130.; *Lob. Obs.* 289—1, and *Ic.* i. 533. 2.; *Park.* 610. 1. Scrophularia nodosa. *Tourn.* 74. *Hook. Fl. Scot.* i. *p.* 189. *Sm. Engl. Fl. v.* iii. *p.* 137. *Hook. Br. Fl. p.* 288. *Willd. Sp. Pl.* iii. 269. *Smith, Flora Brit.* 663. *Eng. Bot. t.* 1544.

*Class* Didynamia. *Order* Angiospermia.

*Nat. Ord,* Personatæ, *Linn.* Scrophularinæ, *Juss.*

*Gen. Char.* *Calyx* five-cleft. *Corolla* sub-globular, resupinate. *Capsule* two-celled.

*Spec. Char.* *Leaves* heart-shaped, acute, deeply serrated, glabrous, three-ribbed at the base. *Stem* rather obtusely four-angled. *Root* tuberous.

THE genus *Scrophularia* comprises a pretty numerous family of plants, natives of almost every climate; near thirty species are cultivated in our botanic gardens, of which number, four, (including the one under consideration) are natives of Britain. The *scrophularia nodosa* is a perennial plant, frequenting groves and hedges, flowering in July.*

The *root* this species of *scrophularia* is tuberous, much granulated or knobbed, from which circumstance it has derived its specific name.† The

* We are told by Withering that it is supposed to yield much honey, and that wasps resort greatly to its flowers. Goats eat it; but horses, cows, and sheep, refuse it.

† The knobs are said to disappear as the plant advances to maturity.

*Scrophularia Nodosa.*

*G. Sorall del*

*stem* rises from two to three feet in height, is erect, simple, quadrangular, smooth and leafy; the *leaves* are placed opposite on the stem, supported on short petioles, heart-shaped, acutely pointed, unequally serrated, smooth and veined; the *flowers* are produced in terminal panicles; the *calyx* is a perianth of one leaf, divided into five rounded segments; the *corolla* is monopetalous, of a dull green colour, its *limb* cleft into five obtuse segments, the two uppermost of which are the largest, and of a livid purplish colour; the *stamens* are four, two long and two short; the germen is somewhat conical; *style* tapering, crowned by a bluntish *stigma*; *capsule* conical, pointed, two-celled, and containing many small *seeds*. Figure (*a*) represents the corolla, spread open, (*b*) the pistillum, (*c*) the calyx, (*d*) the capsule, (*e*) a seed.

*Sensible Qualities, &c.* The leaves of *figwort* have a rank, fetid smell, somewhat like elder leaves, and a disagreeable bitter taste, both of which they partly lose by drying. The root has a very nauseous odour, and a sweetish, but somewhat acrid taste. The root and leaves yield their qualities to water and proof spirit; the watery infusion is of a pale yellowish colour, and precipitates sulphate of iron brown. We have not learned that this plant has been chemically analysed.

*Medical Properties and Uses.* *Figwort* is considered diuretic and sedative, but it is seldom employed in practice; although, from its good effects in scrophula, it is supposed to have derived its generic name. It has also been used with good effect as a topical application* (in the form of fomentation) to piles, ulcers and cutaneous eruptions,† and to promote suppuration in malignant tumours.‡ There is no officinal preparation of this plant, and never having prescribed it, we can say nothing of the doses in which it should be taken; but, from its reputed good effects in scrophula, &c. we should deem it worthy of further trials.

**Off.** The herb.

* We are told by Gerarde that "divers do rashly teach, that if it be hanged about the necke, or else carried about by one, it keepeth a man in health.'

† Swine that have the scab are cured by washing them with a decoction of the leaves.

‡ Among the uninformed people in some parts of the country it is held in great estimation, both as an internal remedy, and externally applied, as a fomentation, to ulcers bruises, &c.

# ORD. XXIV. PAPILIONACEÆ.

## PTEROCARPUS ERINACEUS. AFRICAN PTEROCARPUS, OR KINO TREE.

*SYNONYMA.* Pterocarpus erinaceus. *Lam. Dict.* v. *p.* 728.; *Illustr. t.* 602. *f.* 4.; *Decand. Prodr. v.* 2. *p.* 419. Pterocarpus Senegalensis; foliis pinnatis, foliolis ovalibus, fructibus lunato-orbiculatis, pubescentibus. *Hook. in Gray's Travels in Western Africa, p.* 395. *t. D.*

*Class* Diadelphia. *Order* Decandria.

*Nat. Ord.* Papilionaceæ, *Linn.* Leguminosæ, *Juss.*

*Gen. Char.* *Calyx* five-toothed; *legume* falcate, leafy, with tumid veins, bordered with a wing, not bursting; *seeds* somewhat solitary.

*Spec. Char.* *Leaves* pinnate; *leaflets* alternate, elliptical, obtuse, smooth above, reddish and pubescent beneath; *legume* with a very short straight point.

THIS species of *Pterocarpus* is a middling-sized *tree;* the *branches* are spreading, and covered with an ash-coloured *bark.* The *leaves* are deciduous, pinnated; *leaflets* are alternate, ovate, obtuse, entire, somewhat larger at the base, thin, smooth above, pubescent, and of a reddish tint beneath, and placed on short *foot-stalks.* The *flowers* are produced in compound terminal *racemes,* supported on short, curved pedicels, with a pair of small, lanceolate *bracteas* at the base of each pedicel. The *calyx* is bell-shaped, unequally toothed, pubescent, and furnished with a pair of small awl-shaped bracteas. The *flowers,* which are numerous, soon fall off; the *corolla* is of

*Pterocarpus erinaceus.*

C. Spratt del.

a yellow colour, papilionaceous, and consisting of a roundish, heart-shaped, spreading *vexillum*, or *standard*, with a waved margin and short *claw*, two lanceolate *wings*, and a short *carina*. The *filaments* are alternately longer, connected at the base, and supporting roundish yellow *anthers*. The *germen* is oblong, pubescent, with a curved, thread-shaped, *style*, and simple *stigma*. The *fruit* is a compressed, orbicular *pod*, with a leaf-like edge, covered at the sides with white bristles, containing a single kidney-shaped *seed*. Fig. (*a*) represents the calyx, (*b*) the stamens, (*c*) the pistil, (*d*) standard, (*e*) one of the wings, (*f*) the carina, (*g*) the legume, (*h*) a leaflet,—all the figures more or less magnified.

This tree is a native of Senegal, and is described by Lamarck under the specific name of *erinaceus*, in the *Encyclopédie Méthodique*.* The plant loses its *leaves* in the month of November, and the *flowers* appear in December.† The officinal *kino* of commerce is the inspissated juice of several different plants. The London College considers the best sort of *kino* to be the product of the tree we have here described. The Edinburgh College, however, has inserted *kino* as the inspissated juice of the *Eucalyptus resinifera*, or *brown gum-tree* of Botany Bay; while the Dublin College (on the authority of Dr. Roxburgh) has named the *Butea frondosa*, as the plant which furnishes the *kino* of the shops. Besides these, it seems there are several other plants which produce this substance, or substances bearing a great resemblance to it.‡ Hence it appears, that the products of several trees, have, at various periods, been imported into this country, under the specific name of *kino*; and that the chemical properties of these different kinds vary considerably.

*Kino* is attained by incisions made in the branches of the tree, when the juice flows out, at first of a pale red colour; but as it concretes, becoming of a deep blood red, and so extremely brittle, that it requires much care in collecting.

*Qualities and Chemical Properties. Botany Bay Kino*‖ is inodorous, some-

* Vol. v. *p.*808.

† A specimen of this tree was sent home by Mungo Park in his last journey, and transmitted to Sir Joseph Banks; and we believe it is still in the Banksian Herbarium.

‡ *Cocoloba uvifera* (or *sea-side grape*), *Nauclea Gambir*, *Swietenia Mahagoni*.

‖ This kind of *Kino*, we are told by Dr. A. Duncan, "is certainly obtained from the *Eucalyptus resinifera*, or *brown Gum-tree* of New South Wales, by allowing the juice, which either flows from it spontaneously, or is procured by wounding the tree, to harden

what bitter to the taste, accompanied with a considerable degree of astringency; it is usually met with in large fragments, very brittle, breaking with a glassy fracture; of a chocolate hue, and affording a brown-coloured powder: but it is not uniform in appearance, some of the fragments being of a paler hue. Water, at 60° dissolves nearly one half, and the infusion is of a brown colour, and transparent. Alcohol takes up rather more than two-thirds of its weight, forming a dark brown tincture. Ether dissolves about one-twentieth, and forms a brownish straw-coloured tincture; which, when evaporated on water, leaves a resinous pellicle, scarcely perceptible; a little extractive is also deposited. The watery solution throws down a copious precipitate of a pink colour, by gelatine; a deep brownish black, by a solution of oxy-sulphate of iron; a copious and quickly-formed olive black, by nitrate of silver; a reddish precipitate, by oxy-muriate of mercury; and a flocculent brown precipitate, by acetate of lead.

*Jamaica Kino*,* which is now seldom to be met with, we are told by Dr. A. T. Thomson, "is, in bitterness and roughness, nearly equal to the last variety *(Botany Bay Kino)*; but these qualities are accompanied with a slight degree of acidity. It is in brittle fragments of an almost black colour, having a shining fracture, in which appear small air-bubbles: the powder is of a dark reddish brown colour." Water dissolves a large portion of this kino; the infusion is clear, and of deep reddish hue; it forms precipitates with gelatine, acetate of lead, nitrate of silver; oxy-sulphate of iron, and oxy-muriate of mercury, and also by potass and the mineral acids.

*African Kino*† is inodorous, and insipid when first taken into the mouth; but after some sime, it imparts a degree of roughness, with a very slight impression of sweetness, feels gritty between the teeth when chewed, and does

in the sun. Some specimens of it, in its fluid state, have even reached this country.—*Edinburgh New Dispensatory, 11th Ed.*

* Dr. Duncan says, "although this has been the longest known in commerce in this city, I have not been able to trace the place of its origin. It is evidently an extract."—It is also scarcely to be distinguished from the extract of the *Swietenia Soymida* sent home by Dr. Roxburgh.

† This sort of Kino is esteemed the best, and is considered, as we have before observed, to be the product of the *Pterocarpus erinaceus;* but among the variety of resins and extracts, which (in commerce) have been denominated *Kino*, it is a matter of extreme difficulty to decide which is, or is not, the product of any specific plant, and the subject appears, altogether, involved in no little obscurity.

not colour the saliva. It is in very small fragments, irregularly shaped, shining, of a deep reddish brown colour, and intermixed with small twigs, portions of dried leaves and other extraneous matter. When reduced to powder, it is of a dark chocolate red. Water at 60° dissolves the greater part it; alcohol about two-thirds, and ether little more than one-third. The ethereal solution, which is of a fine claret colour, when evaporated on the surface of water, leaves a pellicle of brittle brown resin; while a red-coloured extractive matter, having a sweetish taste, remains dissolved in the water. The watery solution affords precipitates, with potass and the mineral acids, also with solutions of nitrate of silver, acetate of lead, oxy-sulphate of iron, and oxy-muriate of mercury.* All the different sorts of *Kino* contain a large proportion of tannin: hence, they cannot, with propriety, be ranked among the resins or gum-resins. We are told by Dr. Thomson, that all the varieties dissolve in solution of pure potass, and of ammonia; and no precipitation takes place on the addition of water. Some chemical change, however, is effected, and the astringent property of the *kino* is completely destroyed; a fact which ought to be kept in remembrance in prescribing this remedy.*

*Medical Properties and Uses.* *Kino* was first introduced into practice by Dr. Fothergill, as a powerful astringent,† and has been much employed in obstinate chronic dysenteries and diarrhœas; in all passive hæmorrhages, from the uterus and intestines; also in fluor albus and diseases arising from the laxity of the solids. By some it is supposed to be an inferior astringent to catechu, and less certain in its effects. This want of uniformity, probably, may be owing to the difference in the quality of the *kino* itself. It is said to increase the power of *cinchona-bark*. Externally, it has been applied as a styptic, to diminish the discharge of sanious matter from ill-conditioned ulcers, and to check hæmorrhages from wounds and ulcers. It is given internally in substance, in doses of from ten to thirty grains; or in the form of watery infusion or tincture: the former in doses of one or two ounces; the latter of one or two drachms.

**Off. pp. Tinctura Kino, L. E. D.**

* Vide London Dispensatory, 4th Ed. *p.* 509. † Ibid. *p.* 508.

† Medical Observations and Inquiries, by a Society of Physicians in London, i. 238, 243.

# ORD. XXV. LOMENTACEÆ.

## MYROXYLON PERUIFERUM. SWEET-SMELLING BALSAM TREE.

*SYNONYMA.* Cabureiba. *Piso. Bras.* 57. 119. Toluifera Balsamum. *Linn. Sp. Pl.* 549. Hoitziloxite, *Hernandez Nova Plant. &c.; Mexican Hist. fol.* 51. *f.* Myroxylon peruiferum. *Linn. f. Suppl. p.* 233; *Willd. Sp. Pl. v.* 2. 546; *Stokes, v.* 2. *p.* 471; *Lambert. Illust. of the Genus Cinchona, p.* 92. Myrospermum peruiferum. *De Cand. Prodr. v.* 2. *p.* 95.

*Class* X. Decandria. *Ord.* I. Monogynia.

*Nat. Ord.* Lomentaceæ, *Linn.* Leguminosæ, *Juss.*

*Gen. Char.* *Calyx*, bell-shaped, five-toothed. *Petals*, five; the upper one larger than the others. *Germen*, longer than the corolla. *Legume* with one seed only at the extremity. *Leaves*, corriaceous, persistent, and, as well as the branches, glabrous. Legumes with the wing thick on one side, veinless on the other. *Style* deciduous. *De Cand.* (Character of *M. Peruiferum* in Mutis, Humboldt, and Decandolle.)

*Spec. Char.* *Leaflets* pointed, emarginate.

THIS is a very handsome *tree;* the *trunk* rises to a considerable height, is straight, smooth, and covered with a compact, coarse, heavy, *bark*, externally of a grey colour, internally of a pale yellow, and abounding with a very fragrant resin, which also pervades every part of the tree; the *branches* extend almost horizontally, and are covered, like the trunk, with coarse bark; the *leaves* are alternate and abruptly pinnate: the *leaflets* nearly op-

*Myrospylon Peruiferum.*

C. Sprake del.

posite, petiolate, ovate, lanceolate, with the apex somewhat obtuse and emarginate, entire, very smooth, shining; the midrib on the under surface pubescent: the *common petiole* is round and pubescent: the *leaflets* vary in number, from two to four or five pairs; the *flowers* are produced on axillary erect *racemes*, longer than the leaves: the *peduncles* are slender, roundish, and pubescent; each accompanied by a very small, erect, ovate, concave *bractea*: the *pedicels* are erect: the *calyx* is bell-shaped, dark green, and divided into five small, nearly equal, segments; but one of them so far separated, as to be found under the germen: the *corolla* consists of five white *petals*, four of which are narrow, equal, lanceolate, and larger than the calyx; the fifth reflexed, broad, and more than double the size of the others; *stamens* inclined, and inserted into the calyx, bearing elongated, sharp-pointed, sulcated *anthers:* the *germen* is oblong, pedicellated: the *style* short, subulate, crooked, and crowned with a simple *stigma:* the pericarp is of a straw colour, club-shaped, somewhat curved and pendulous, globular near the top, and terminated by the curved style: in the cell formed at the curved part, it contains a single *seed*, which is crescent-shaped, and projects from the cell. (*a*) the capsule; (*b*) the calyx and germen; (*c*) an anther.

The *Peruvian Balsam-tree* is a native of South America; inhabiting the warmer regions of that continent; growing on the mountains of Panatalmas, in the forests of Paxaten, Muna, Cuchero, and Puzuzu, and in some of the warm situations near the river Marañon; flowering from August to September. This tree was first discovered by Mutis, about the year 1781, who sent a specimeu of it, both in fruit and flower, to the younger Linnæus. The natives inhabiting the countries where this tree grows, call it *Quinquino;* they use the bark as a perfume. The *Peruvian Balsam* and the *Balsam of Tolu* of the shops, are both the product of this tree: formerly, it was supposed that the latter balsam was the product of a different tree from that which yields the former, but it has been ascertained that both balsams are the produce of the *Myroxylon Peruiferum.* We are told by Ruiz, that the balsam is procured by incision at the beginning of the spring, when the showers are frequent, short, and gentle: it is collected into bottles, where it keeps liquid for some years, in which state it is called *white liquid balsam.* But when the Indians deposit the liquid in mats or calabashes, which is commonly done in Carthagena and in the mountains of Tolu, after some

time it condenses and hardens into resin, and is then denominated, *Dry white balsam, or balsam of Tolu,* by which name it is distinguished in the druggists' shops. M. Valmont de Bomare says, in his Dictionary of Natural History, that if an extract be made from the bark, by boiling it in water, it remains liquid, and of a blackish colour, known under the appellation of *black Peruvian balsam.**

*Sensible and Chemical Properties.* Genuine *Peruvian balsam* is of a deep reddish brown colour, very viscid, and of the consistence of honey when first taken from the comb; it has a warm, aromatic, and slightly bitter taste, and when swallowed leaves a somewhat acrid sensation in the throat; its odour is very fragrant. Distilled with water, it yields a small quantity of reddish limpid oil, and benzoic acid sublimes in the neck of the retort; the remaining matter is resin: when boiled with water, the liquid becomes acidulated, reddens vegetable blues, and deposits on cooling, crystals of benzoic acid. It dissolves completely in ether, and also in alcohol, but the latter requires to be in considerable quantities. The alkalies and their carbonates, form with it thick masses, which, on the addition of sulphuric acid, lets fall a resinous matter, and benzoic acid, crystallizes. Treated with nitric and muriatic acids, the presence of prussic acid is detected, benzoic acid sublimes, and the residual matter is artificial tannin. Mr. Hatchett found that when this is heated with sulphuric acid, artificial tannin is also formed, and the charcoal remaining amounts to no less than 0,64 of the original weight of the balsam.† At 550° the balsam begins to boil when exposed to heat in a water-bath, and some gas is discharged. At 594° the oil mixed with a little water, comes over pretty fast. Lichtenberg kept four ounces of balsam at the temperature of 617° for two hours, and obtained two ounces of a yellowish oil, and a crystallized mass of benzoic acid; which, together with the water, weighed six drachms and a half. The gas obtained amounted to fifty-eight ounce measures, thirty-eight being carbonic acid; the rest burnt like oleifiant gas. From the analysis of Stoltze, 1000 parts of balsam consist of 24 of brown, nearly insoluble resin, 207 of soluble resin, 690 of a peculiar kind of volatile oil, 64 of benzoic acid, and 6 of extractive matter.

*Tolu Balsam.* This balsam was formerly supposed to be the produce of a

* A fictitious composition, a mixture of resin, and some volatile oil, scented with benzoin, is often sold for the genuine *Peruvian balsam,* and the fraud is not readily detected.

† Hatchett. Phil. Trans. 1806.

different tree from that which yields the *Peruvian Balsam*, but as we have before observed, it has been satisfactorily ascertained that both balsams are the produce of the species of *Myroxylon* above described. The *Tolu balsam* is, as we noticed, the *white balsam of Peru* hardened by exposure to the atmosphere. It comes to this country in gourd-shells, or calabashes; its odour is extremely fragrant, somewhat resembling that of lemons; its taste aromatic and somewhat sweetish; of a reddish-brown colour, and of a thick tenacious consistence, becoming brittle by age. In distillation with water, it yields a small portion of volatile oil, and impregnates the water with its odour; if the process be continued, a quantity of benzoic acid sublimes. It is soluble in alcohol and ether, and also in the alkalies. We are told by Mr. Hatchett, that when dissolved in a very small quantity of the solution of potass, its odour is lost, and it acquires the smell of the clove pink. When digested in the sulphuric and nitric acids, a considerable quantity of pure benzoic acid sublimes, and with the latter some trace of prussic acid is also evolved.

*Medical Properties and Uses.* *Peruvian balsam* is stimulating and tonic, and has also been regarded as expectorant: hence, it has been recommended as an efficacious remedy in obstinate coughs, chronic asthma, and other pulmonary diseases, when attended with an increased secretion of mucus; but from its heating and stimulating qualities, it is improper in those cases which are attended with inflammation. In chronic rheumatism, gleets, seminal weaknesses and leucorrhœa, as well as in some other cases of debility, its tonic powers appear to have proved efficacious. It has been recommended to be dropped into the ear, combined with ox-gall, in the proportion of one part of the former to three of the latter, in fœtid discharges of that organ. Formerly it was much used as a local application to foul ulcers, especially those of an indolent kind; and in the hands of the late Mr. Whateley, it appears to have been a very successful application. *Peruvian balsam* may be taken in doses of from 30 to 60 drops, in any proper vehicle, and repeated at intervals, according to circumstances. *Tolu balsam* possesses similar qualities to the former, and is applicable to the same diseases; but these have been already treated of under the article *Toluifera balsamum*, (see p. 607, vol iii of this work.)

Off. pp. Syrupus Tolutanus, L.E.

Tinctura Toluiferæ Balsami, E.D.

# ORD. XXVI. MULTISILIQUÆ.

## DIOSMA CRENATA. CRENATED DIOSMA.

*SYNONYMA.* Diosma crenata. *Lodd. Bot. Cab. t.* 404.* *De Cand. Prodr. v.* i. *p.* 714. *Thunb. Prodr. v.* i. *p.* 43? *Fl. Cerp. v.* ii. *p.* 146? *Linn. Amœn. Acad. v.* iv, *p.* 308? *Wildd. Sp. Pl. v.* i. *p.* 1138? Hartogia betulina. *Berg. Cap.* 67.

*Class* V. Pentandria. *Ord.* I. Monogynia.

*Nat. Ord.* Multisiliquæ, *Lin.* Rutaceæ, *Juss.*

*Gen. Char.* *Petals* five. *Nectary* of five scales crowning the germen. *Capsules* three or five, connected. *Seeds* in an elastic, bivalved arillus.

*Spec. Char.* *Leaves* ovate acute, dotted, with glands beneath, and at the serrated margins. *Pedicels* solitary, single-flowered, somewhat leafy.

THIS species of *Diosma* forms a slender branching shrub. Its *branches* are smooth, rounded, or somewhat angular, and of a purplish colour; the leaves are opposite, ovate, acute, crenated, of a dark bright green on the upper surface, paler on the under, and there full of small pellucid punctures, par-

*The species of the genus *Diosma* are still involved in much obscurity, and none more so than the present individual; in consequence of the very imperfect characters given by its early describers. We have adopted the plant of Loddiges and De Candolle; the latter author very justly doubting if that of Linnæus and Thunberg can be the same, since they describe the leaves as scattered, not opposite. Sprengel, again, though doubtfully, unites the Linnæan *Diosma crenata* with the *Diosma senatifolia* of Antis, a totally different plant from ours, and the *Barosma serratifolium* of Willdenow.

*Linnea borealis.*

*G. Sprattjdd.*

ticularly at the edges between each tooth. The *flowers* are solitary, on short pedicels, and arise from the ends of short, opposite, lateral, leafy shoots. The *calyx* consists of five deep, ovate, acute, permanent, segments; the *corolla* is composed of five delicate, elliptic-oblong, slightly spreading, *petals*, of a pale reddish tint, or white. The *nectaries* are five linear-lanceolate scales. *Filaments* five, awl-shaped, supporting ovate, incumbent anthers; the *germen* is superior, turbinate; *style* erect, the length of the stamens crowned with a simple *stigma*. The *capsule* is ovate, containing an oblong, solitary *seed*, inclosed in an elastic arillus.

The *crenated Diosma* is a perennial shrub, native of the Cape of Good Hope, in this country blossoming about March, and requiring the protection of a green-house in winter. If our plant be the same as that of *Ait. in Hort. Kew. ed.* 2. *v.* ii. *p.* 32. it was first introduced into this country by Mr. Francis Masson, in the year 1774.

*Sensible and Chemical Properties, &c.* The whole of this plant has a very strong and peculiar odour, and a slightly bitter, mucilaginous taste. By distillation with water, it affords an essential oil, with the odour and flavour of camphor and rue. It yields to water, on long continued boiling, a considerable quantity of mucilage. The essential oil imparted to boiling water by infusion, is dissipated by decoction. The leaves of this plant have been analyzed by M. Cadet, Junior, and yielded the following products: Essential Oil 0.665, Gum 21.17, Extractive 6.17, Chlorophylle 1.10, Resin 2.151.*

*Medical Properties and Uses.* This plant has been lately introduced into the Dublin pharmacopœia as an officinal drug,† and esteemed to be an excellent stomachic, and an efficacious diuretic. From the experience of several eminent physicians in Dublin, it appears to possess very considerable powers on the urinary organs, and to have proved a very powerful remedial agent in chronic inflammations of the bladder and urethra, arising from stricture of the urethra, calculi, diseased prostate gland, &c. &c. Dr. M'Dowall has given many cases of these kinds, in which it has proved eminently successful.‡ It has also been administered with beneficial effects in chronic rheumatism. For many years it appears to have been successfully prescribed in

* Journ. Chim. iii. 44.

† Dr. Reece of Bolton Row, we believe, was the first to excite the attention of British practitioners to the *Diosma crenata*.

‡ Vide Dublin Medical Transactions.

Holland, for inflammatory affections of the membranes, particularly of the urethra, bladder, prostate gland,* rectum, &c.

Off. Prep.—Inf. Diosmæ crenatæ. D.

* It is probable the Dutch derived their knowledge of the medicinal properties of this plant from the natives of the Cape, who, we are told, are partial to a spirit distilled from its leaves, in the dregs of wine, which they regard as a sovereign remedy for many acute and chronic diseases of the stomach, intestines, and bladder. We are also informed by Burchell, (vide Travels in Africa) that the Hottentots apply a decoction of the leaves t fresh wounds, and use them as a cosmetic.

---

## RANUNCULUS FLAMMULA. LESSER SPEAR-WORT CROWFOOT.

*SYNONYMA.* Ranunculus longifolius, aliis flammula. *Bauh. Hist. v.* 3. 848. *f.* Ranunculus flammeus minor. *Raii Syn.* 250. *Ger. Em.* 961. 8. Ranunculus. *n.* 1182. *Hall. Hist. v.* 2. 78. Ranunculus flammula. *Linn. Sp. Pl.* 772; *Willd. v.* 2. 1307; *Hook. Scot.* 174.; *Stokes, Bot. Mat. Med. v.* 3. 258; *Bull. Fr. t.* 15; *Curt. Lond. fasc.* 6. *t.* 37; *Fl. Brit.* 587; *Eng. Bot. v.* 6. *t.* 387; *Hook. Brit. Fl. p.* 265.

*Class* Polyandria. *Ord.* Polygynia.

*Nat. Ord.* Multisiliquæ, *Linn.* Ranunculaceæ, *Juss.*

*Gen. Char.* *Calyx* five-leaved; *petals* five or more, with *nectaries* in their claws; *seeds* numerous, naked.

*Spec. Char.* *Leaves* linear-lanceolate, nearly entire, bluntish, stalked, the lower ones ovato-lanceolate; *stem* reclining at the base, and rooting; *seeds* smooth.

THE *root* of this species of ranunculus is perennial, and consists of many long simple fibres, some of which issue from the lower joints of the stem. The *stem* is about a foot, or a little more in length, reclining, partly decumbent at the base, branched, leafy, round, hollow, smooth, of a pale green, slightly tinged with purple. The *radical leaves* are ovato-lanceolate, pointed

*Ranunculus flammula*

G Sprat del.

at both ends, supported on long *foot-stalks*, which are hollow on one side, and flattened; the *stem leaves* are lanceolate, alternate, and stand upon shorter foot-stalks, which are dilated and sheathing at the base; the uppermost, and those next the flowers, are linear, all of them smooth, more or less toothed, but sometimes entire. The *flowers* are terminal, opposite the leaves, and are placed on round, erect stalks, without bracteas. The *corolla* is of a bright yellow colour, composed of five roundish, somewhat concave, heart-shaped *petals*, with short claws, and very minute nectaries. The *calyx* consists of five ovate, obtuse, slightly villous, concave, deciduous, leaves of a yellowish colour. The *stamens* are numerous, not half the length of the *petals*, with oblong *anthers*. The *germens* are collected into a head, each furnished with a small reflected *stigma*, without any *style*. The *seeds* are lenticular, smooth, with a small, slightly curved, point. Figure (*a*) represents a single petal, (*b*) the calyx, (*c*) the germens, (*d*) a stamen.

This species of *crowfoot* is indigenous to Britain, flowering in the months of June, July, and August; it is also a common plant throughout Europe, delighting in watery situations, yet found abundantly in the wet and marshy places on heaths and commons. We are told by Mr. Lightfoot, that in gravelly soils it degenerates to a trailing, dwarfish size, with small linear leaves, and that in some states it differs very little from the *ranunculus lingua*, (great spear-wort crowfoot.) The genus *ranunculus* forms a very numerous tribe of plants,* the greater number of which possess acrid qualities. The indigenous species that are most common, and also the most poisonous, are, the *ranunculus acris*, *ranunculus sceleratus*, *ranunculus bulbosus*, *ranunculus arvensis*, and *ranunculus flammula*. The former species will be found figured in Vol. III of this work. And as the sensible qualities, poisonous effects, medical properties, and uses, of these several species of *ranunculus*, are nearly the same, we must refer our readers, for information on those subjects, to that article. The *ranunculus flammula* has obtained a place in the *Materia Medica* of the Dublin College; and without doubt with the intention of being employed as a vesicatory, for which purpose it was formerly much used; but since the introduction of cantharides, this acrid plant has been nearly laid aside; but we are told that it vesicates with much less pain than the Spanish

* Sixty-one species are enumerated by Willdenow, in the fourteenth edition of his *Systema Vegetabilium*: one hundred and fifty-nine by Decandolle, in his *Prodromus*. Fifteen species are natives of Britain. (See Smith's *English Flora.)*

flies, and has this decided advantage in many cases, that it does not affect the urinary passages.

The acrid principle of this plant, rises in distillation with water, which, taken into the stomach, acts almost instantaneously as a vomit.* Dr. Withering says, "I feel myself authorized to assert, that, in the case of poison being swallowed, or other circumstances occurring, in which it is desirable to make the patient vomit instantaneously, it is preferable to any medicine yet known, and does not excite those painful contractions of the upper part of the stomach, which the white vitriol sometimes does, thereby defeating the intention for which it was given."

* Some years ago a man travelled through several parts of England, administering vomits, which operated almost the instant they were swallowed. The distilled waters of the *ranunculus flammula* proved to be his medicine.

*Melaleuca cajuputi.*

B. Spratt del

# ORD. XXIX. HESPERIDEÆ.

## MELALEUCA CAJUPUTI. LESSER CAJEPUT TREE.

*SYNONYMA.* Melaleuca Cajuputi. *Roxb. Cat. p.* 59. Melaleuca minor. *Sm. in Rees. Cycl. n.* 2. *Decand. Prodr. v.* 3. *p.* 212. Arbor alba minor. *Rumph. Amb. v.* 2. *p.* 76. *t.* 17. *(f.* 1. *Roxb. et forsan f.* 2. *Decand.)*

*Class* XVIII. Polyadelphia. *Ord.* III. Icosandria.

*Nat. Ord.* Hesperideæ, *Linn.* Myrti, *Juss.* Myrtaceæ, *Decand.*

*Gen. Char.* *Calyx* five-parted, semi-superior; *corolla* five-petaled; *stamens* (about forty-five) very long, conjoined in five bodies; *style* single; *capsule* three-celled; *seeds* numerous.

*Spec. Char.* *Branchlets* pendulous; *leaves* alternate, shortly petioled, elliptic-lanceolate, three and five-ribbed; *spikes* terminal and axillary, comose, villous; *bracteas* lanceolate, three-flowered; young *branches* and *germens* downy.

THIS very elegant *tree* is a native of the Molucca Islands; it is of a small size, seldom attaining a greater height than twenty feet. The *trunk* is tolerably erect, but crooked, and slender, when considered in reference to the age* of the tree; the *bark* is of a very light or whitish ash colour, soft, thick, and spongy, pretty smooth on the surface; the exterior lamina peels off from time to time in thin flakes, like the birch tree, whilst the interior bark

* When twenty years old the thickest part of the tree not exceeding the circumference of a man's leg.

may be separated into numerous laminæ, like the leaves of a book. *Branches* scattered, with slender twigs, often drooping as those of the weeping willow; they are rounded and smooth, their young shoots sericeous. The *leaves* are alternate, and point in every direction, narrowly lanceolate, shortly petioled, and, while young, sericeous; but, when full-grown, glabrous, deep green, three or five-nerved, sometimes slightly falcate; their entire length is from three to five inches, and from half to three quarters of an inch broad. On being bruised, they smell powerfully of the substance they yield: yet the cells which contain this aromatic fluid, are scarcely visible in the fresh leaves. The *flowers* are produced in terminal *spikes*, and from the extreme axils, downy; while the flowers are young, there is a scaly cone at the apex, which soon advances into a leafy branchlet. *Bracteas* solitary, lanceolate, sericeous, three-flowered, caducous. *Flowers* ternate, sessile, small, white, inodorous. *Calyx* urceolate, semi-superior, sericeous, margin of five semi-lunar segments. *Petals* five, orbicular, short-clawed, white, much longer than the segments of the calyx. *Filaments* from thirty to forty, united into five segments at the base, three or four times longer than the petals, and with them, inserted into the large, villous, five-lobed rim of the calyx, alternate with its segments. *Anthers* ovato-cordate, with a yellow gland on the apex. *Germen* ovate, united to the calyx, three-celled, with numerous ovules in each, attached to an elevated receptacle in the inner and lower angle of each cell. *Style* rather longer than the stamens. *Stigma* obscurely three-lobed. *Capsule* completely enveloped in the thick, fleshy, gibbous, permanent tube of the calyx, three-lobed, three-celled, three-valved. *Valves* thin, hard, and elastic, opening from the apex; partitions contrary; *receptacles* triangular, thin, flat, lodged in the inner and lower angle of the cell. *Seeds* numerous, regularly wedge-shaped. Figure (*a*) the flower, (*b*) the germen, style and stigma, (*c*) section of the germen.

The beautiful green essential oil of commerce, known by the name of *cajuput oil*, was formerly supposed to be the produce of the *Melaleuca leucodendron (Linn. Mant.)*; but it appears, from the specimens of the tree yielding the true *cajuputi*, sent home by Mr. Christopher Smith, that the species is different, and referable to Table 17 of Rumphius's *Herbarium Amboinense* (vol. ii.) and not to that author's *arbor alba*, *t.* 16. After the careful examination of specimens in the Linnæan Herbarium, by Sir James E. Smith, and in Sir Joseph Banks's and other collections, by Dr. Maton, we are authorized

to consider the tree which yields the genuine *cajuput-oil* as a distinct species, and from the name of its medicinal product, to call it *Melaleuca Cajuputi*,* as Dr. Roxburgh has termed it in his catalogue of the Calcutta Botanic gardens.

The following account of the propagation, &c. of this plant, we transcribe from the Transactions of the Medico-Botanical Society of London, from the description furnished to the Society by Thomas Henry Colebrooke, Esquire, F.R.S. from the MS. of Dr. Roxburgh :—" During my absence at the Cape of Good Hope, in 1798, Dr. John Fleming had charge of the Botanic garden ; at the same time, Mr. Smith, the nurseryman, was employed on the Moluccа Islands, collecting plants for the garden, consequently an excellent time for obtaining growing plants of these trees. Dr. Fleming, therefore, gave Mr. Smith strict orders to be very careful to get the proper sort (two or three being mentioned by Rumphius) from which the best oil was obtained. This commission Mr. S. executed to our satisfaction, many thriving plants having been sent to the garden by the close of the year, where they grow freely ; and in six or seven years they began to blossom at various times of the year, which they have hitherto continued to do, and to ripen their seeds perfectly. From them, numerous plants have been reared, and not only distributed over many parts of the continent of India, but sent to various other parts of the world. It is from the original young trees, now (1811) thirteen years old, that the botanical description and accompanying figures are taken.† This species of *Melaleuca* may be cultivated either by seed or root ; when by the latter, slender pieces of the root are cut into small bits, and laid horizontally in the earth (this is done in the rainy season) when they readily produce roots.

The oil is obtained by distillation from the dried leaves. In the island of Banda large quantities are prepared, and sent to Holland in copper flasks, from whence it is imported into this country.

*Qualities, &c.* The *oil of cajuputi*, as it comes to us, has a pungent taste, like that of camphor ; its odour is very powerful, resembling a mixture of

* We are told by Dr. Ainslie, that this species of Melaleuca appears to have owed its specific name to its colour, *Cajuputi*, or *Kayu-puti*, in the Malay language signifying *white wood*. It is also known in the Malay countries under the names of Galam, Daun Ketsjil, &c.—*Materia Medica, vol.* i. *p.* 261.

† Our drawing was copied from the one published by the Medico-Botanical Society of London, from the original drawing, furnished to that Society by T. H. Colebrooke, Esq. F.R.S. Ed.

camphor and oil of turpentine, but gradually becomes more fragrant. It is transparent, and of a beautiful bluish green colour; when dropped on the surface of water, it diffuses itself over it, and very rapidly and completely evaporates: this is said to be a test of its purity.* When ignited, it burns rapidly, without leaving any residue. When pure, it is entirely soluble in alcohol, and partly so in water. Its green colour is said by some to be derived from the copper vessels in which it is imported, but by others this is denied; in confirmation of which, we are told by Mr. Brande, that none of the samples which he examined contained copper.

For the *Medical Properties and Uses* of this tree, we refer our readers to Vol. III. page 547 of this work.

* *Cajuputi oil* is said to be frequently adulterated with a mixture of fine oil and oil of turpentine. Ed.

# ORD. XXXII. GRUINALES.

## QUASSIA EXCELSA. LOFTY, OR ASH-LEAVED QUASSIA.

*SYNONYMA.* Quassia excelsa. *Swartz in Stockh. Trans. for* 1788, *p.* 302, *t.* 8; *Prodr. Ind. Occid. v.* 2,742; *Willd. Sp. Pl. v.* 2. *p.* 569. Simaruba excelsa. *De Cand. in Ann. du Mus. v.* 17, *p.* 424; *Prodr. v.* 1. *p.* 733; Unchte Quassie, *Nom. Triv. Willd.* Quassia Polygama. *Trans. Roy. Soc. Edin. v.* 3. *p.* 205. *t.* 6.

*Class*, Decandria. *Ord.* Monogynia.

*Nat. Ord.* Gruinales, *Linn.* Magnoliæ, *Juss.* Simarubeæ, *Rich. De Cand.*

*Gen. Char.* *Calyx*, five-leaved. *Petals*, five. *Nectary*, composed of five scales. *Drupes*, five, distant, bivalved, placed on a fleshy *receptacle*.

*Spec. Char.* *Flowers*, polygamous. *Stamens*, five. *Leaves*, pinnate. *Leaflets*, opposite, petioled; common stalk naked.

*Quassia excelsa.*

The *Quassia excelsa* is a very large and lofty *tree*, frequently rising to the height of 100 or more feet, and measuring from eight to ten feet in circumference: the *trunk* is straight, tapering, and sends off many branches towards the top; both trunk and *branches* are covered with a smooth, ash-coloured, or grey *bark*; the *wood* is of a pale yellowish colour, tough, but not very hard, and takes a good polish: the *leaves* are pinnated, composed of from four to eight pair of pinnæ, with a terminal one; the *pinnæ* are nearly opposite, elliptical, pointed, firm, entire, smooth, from two to four or five inches in length, and standing on short footstalks: the ribs are of a reddish colour, and the young leaves are covered with a fine brownish down. The *flowers* are produced in clusters, or *panicles*, from the lower part of the last shoot before the leaves. The *male* and *hermaphrodite flowers* are in the same cluster: the *male flowers* are similar to the hermaphrodite, excepting that they have the rudiments only of a *style*, and no *stigmas*: the *calyx* is very small, and consists of five, equal, ovate, pointed, segments; the *corolla* of five, small, equal, lanceolate, yellowish-green *petals:* the *filaments* are mostly five (sometimes four to six) a little longer than the petals, downy, and supporting roundish *anthers:* the *germen* is ovate, bearing a slender *style*, with a trifid *stigma:* the *fruit* is a small, round, smooth *drupe*, about the size of a pea, when ripe, of a blackish colour; these drupes are one, two, or three together, attached sideways to a round, fleshy receptacle. It flowers in October and November, and the fruit is ripe in December. Fig. (*a*) represents the ripe fruit; (*b*) a male flower; (*c*) an hermaphrodite flower; (*d*) a stamen—(these three last somewhat magnified;) (*e*) a transverse section of the fruit.

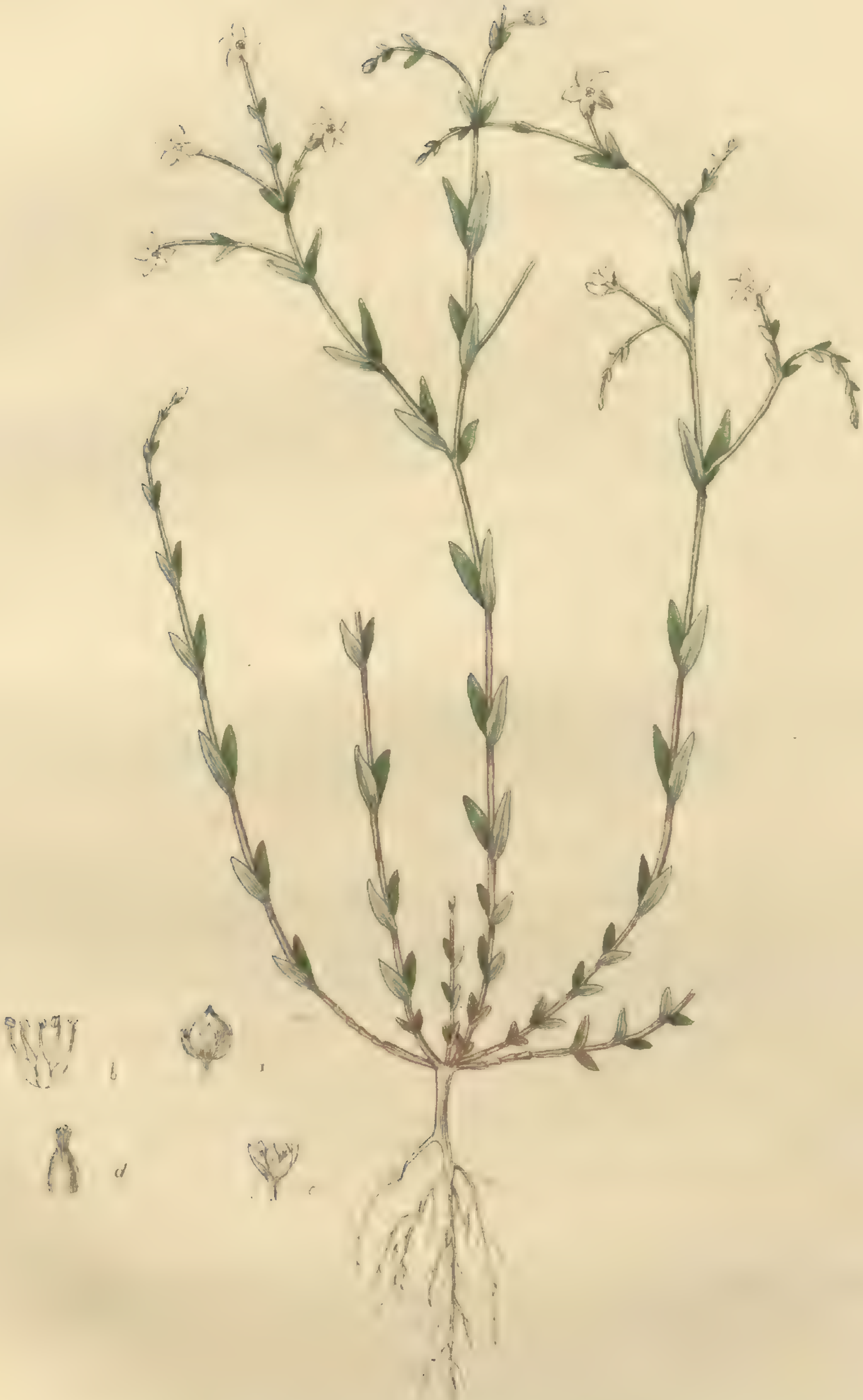
This lofty species of *Quassia* is a native of Jamaica and the Caribbean Islands. Dr. Wight, in his account of the medicinal plants growing in Jamaica, notices this species of *Quassia* under the title of *Picrania amara:* it is also mentioned by Mr. Brown and Dr. Patrick Brown, in their histories of Jamaica, by the names *Xylopicrum*, *Xylopia glabra*, bitter-wood or bitter-ash. But we are indebted to Mr. John Lindsay, Surgeon, of Jamaica, for an accurate account of this tree, which he published, accompanied with a figure, in the third volume of the Transactions of the Royal Society of Edinburgh.

*Sensible Qualities and Chemical Properties, &c.* The wood comes to us in billets of various sizes, which are reduced to chips or shavings by the

druggists. *Quassia-wood* is inodorous, its taste intensely bitter: both water and alcohol take up its bitterness. The watery infusion, evaporated by a low heat to dryness, leaves a brownish yellow, somewhat transparent, intensely bitter substance, which continues ductile for some time, but by degrees becomes brittle. This substance has been regarded as a vegetable constituent *sui generis*, by its discoverer, Professor Thomson, of Glasgow, who has named it *Quassine*.* Quassine possesses the following properties:—When heated it softens, swells, and blackens; then burns away with but little flame, and leaves a small quantity of ashes: it is very soluble in alcohol and water: it does not change the colour of the infusion of litmus. The alkalies produce no alteration in the diluted solution of the bitter principle. Lime-water, barytes-water, and strontian-water, occasion no precipitate; neither is any precipitate thrown down by silicated potass, aluminated potass, or sulphate of magnesia. Oxalate of ammonia occasions no precipitate, neither does corrosive sublimate, nor nitrate of mercury: nitrate of copper and the ammoniacal solution of copper leave it unaltered; but muriate of copper gives a white precipitate, which falls when this liquid salt is dropped into water. Nitrate of silver renders the solution muddy, and a very soft, flaky, yellow precipitate falls slowly to the bottom. Sulphate and permuriate of iron occasion no change. Muriate of tin turns the solution muddy, but occasions no precipitate unless the solution is concentrated; in that case a copious precipitate falls. Acetate of lead occasions a very copious white precipitate, but the nitrate of lead effects no alteration. Nitrate of bismuth produces no change; though, when the salt is dropped into pure water, a copious white precipitate appears. Tartar emetic leaves it unaltered; but when the muriate of antimony is used, the white precipitate appears, which always falls when this salt is dropped into pure water. Muriate and arseniate of cobalt, arseniate of potass, tincture of nut-galls, and gallic acid, produce no effect. The little action of the different re-agents is remarkable; nitrate of silver and acetate of lead being the only substances which throw it down.† These properties Dr. Thomson remarks, are sufficient to convince us that the bitter principle differs considerably from all other vegetable principles.

* *Vide* Thomson's Chemistry, 4th edit. v. 32.

† Hence nitrate of silver and acetate of lead are incompatible in formulæ with it.




*Linum Catharticum.*

G. Spratt del

*Medical Properties and Uses.* *Quassia excelsa* is a simple and powerful bitter; hence it is considered tonic, and has been employed under the same circumstances, and for the same diseases in which the *Quassia amara* has been found useful;* it is, therefore, unnecessary to enlarge upon the subject here. It is usually exhibited in the form of infusion, combined with mineral acids or neutral salts, according to circumstances: it may be given in substance, in doses of from ten to thirty grains, repeated three or four times a day; but it is an inconvenient form for administering quassia, as it cannot be reduced to a fine powder; hence its bulk and extreme bitterness render it excessively nauseous when exhibited in substance.

Off. Prep. Infusam Quassiæ, L.E.
Tinctura Quassiæ Excelsæ, E.D.

* *Vide* Quassia amara, vol. iii. p. 573—574 of this work.

---

## LINUM CATHARTICUM. PURGING FLAX, OR MILL-MOUNTAIN.

---

*SYNONYMA.* Linum pratense, flosculis exiguis. *Bauh. Pin.* 214. Linum. *n.* 839. *Hall. Hist. v.* i. 374. Chamælinum Clusii flore albo, sive linum sylvestre catharticum. *Park.* 1336. Linum sylvestre catharticum. *Raii Syn.* 362; *Ger. Gm.* 560. *f.* Linum catharticum. *Linn. Sp. Pl.* 401; *Willd. v.* i. 1541; *Sm. Fl. Brit.* 344; *Eng. Bot. v.* vi. *t.* 382; *Curt. Flor. Lond. fasc.* 3. *t.* 19. *Hook. Flor. Scot.* 97; *Stokes, v.* ii. 188. *Br. Fl. p.* 147.

*Class* V. Pentandria. *Ord.* V. Pentagynia.

*Nat. Ord.* Gruinales, *Linn.* Lineæ, *Decand.*

*Gen. Char.* *Calyx* five-leaved; *petals* five; *capsule* five-valved, ten-celled; *seeds* solitary.

*Spec. Char.* *Leaves* opposite, obovate-lanceolate; *stem* dichotomous; *petals* acute.

THE *root* of this species of Flax is small, tapering and woody, and sends up several slender, smooth, straight *stems*, which rise to the height of six or eight inches, and are branched towards the upper part; the *leaves* are small, lanceolate, elliptical, smooth, sessile, and stand opposite in pairs;* those towards the lower part of the stem are rounded at the extremity; the *flowers* are small, and stand upon long *peduncles*, at the end of the branches; the *calyx* is composed of five permanent, lanceolate leaves, serrated and one-ribbed; the *petals* are white, ovate, pointed, and slightly united at the base; the *germen* is ovate, triangular, and crowned with yellow *stigmas*; the *filaments* are ranged in a circle round the germen, and support yellow *anthers*; the *capsule* is globular, about the size of a pea, ten-celled and ten-valved, each *cell* enclosing an oblong, glossy, pointed *seed*. Figure (*a*) the capsule, (*b*) the stamens, (*c*) the calyx, (*d*) the germen and styles.

This small, delicate species of flax is indigenous to Britain. It is a very common plant throughout the kingdom, on hilly situations, particularly where the soil is chalky;† flowering from June to August, and it is sometimes found in meadows.

*Sensible Qualities, &c.* *Purging-flax*, when well dried, is of a green colour. It is nearly inodorous, whether in its recent or dried state. Water extracts the virtues of this plant, which communicates to the menstruum a yellowish-brown colour (resembling an infusion of tea); with sulphate of iron it strikes a black colour. Macerated in sulphuric ether, it affords a fine green tincture, which deposits, when evaporated upon the surface of water, a green, bitter resin, and an extractive matter, on which, probably, the virtues of the plant depend.

*Medical Properties and Uses.* This species of *flax* was highly extolled, both by Lewis and Gerarde, as a purgative; the former of whom states that it occasionally acts as a diuretic. It operates chiefly, however, as a gentle cathartic; the watery infusion, made with two drachms of the dried plant to one pint of boiling water, and taken to the quantity of two ounces, once or twice in the day, usually keeps the bowels pretty well open. The watery infusion also forms a convenient vehicle for salts, rhubarb, &c. Like most

* It belongs to the second section of the genus *Linum*, from having opposite leaves.

† It grows in great abundance on the waste ground, opposite the chalk-pits, at Greenhithe.

*Lithrum salicaria.*

G. Spratt del.

other aperients, it occasionally produces a little griping ;* which may be obviated by the addition of a drop or two of some essential oil. We are told by Dr. A. T. Thomson, that "it possesses no particular advantages, and only swells unnecessarily the list of purgatives ;" but we cannot agree with him in this opinion, feeling that a preference should be given to our indigenous plants, rather than to those of foreign growth.

Off. The Herb.

* We are told that Mr. Houlton has prepared an extract, which operates somewhat violently in doses of ten grains.

---

# ORD. XXXIV. CALYCANTHEMÆ.

## LYTHRUM SALICARIA. LOOSE-STRIFE, OR PURPLE WILLOW HERB.

---

*SYNONYMA.* Lysimachia altera. *Matth. Valgr. v.* ii. 299. *f.*; *Camer. Epit.* 687. *f.* Lysimachia spicata purpurea. *Bauh. Pin.* 246. Salicaria. *Hall. Hist. v.* i. 378. Lythrum salicaria. *Linn. Sp. Pl.* 640. *Willd. v.* ii. 865; *Curt. Lond. fasc.* iii. *t.* 28; *Hook. Scot.* 147. *Fl. Brit.* 510; *Eng. Bot. v.* xv. *t.* 1061; *Hook. Br. Fl.* 217.

*Class* XI. Dodecandria. *Order* I. Monogynia.

*Nat. Ord.* Calycanthemæ, *Linn.* Salicariæ, *Juss.*

*Gen. Char.* *Calyx* twelve-toothed, inferior; *petals* six, inserted into the calyx; *capsule* two-celled, with many *seeds.*

*Spec. Char.* *Leaves* opposite, lanceolote, heart-shaped at the base; *flowers* in whorled leafy *spikes*; *stamens* twelve.

THIS species of *Lythrum* rises to the height of three or four feet. The *root* is woody, branched, spreading, and furnished with many fibres; the *stem* is erect, leafy, quadrangular, (but, towards the lower part, often hexagonal) smooth or downy, and of a reddish colour. The *leaves* vary in length, are opposite, sessile, lanceolate, entire, cordate at the base, smooth on their upper surface, and somewhat pubescent beneath; the *flowers* arise from the axills of the leaves, and terminate the stem in a *spike* of *whorls; calyx* inferior, cylindrical, striated, downy, and divided at the margin into twelve segments; of which six are long, awl-shaped, and erect; the others smaller, ovate, concave, and bent inwards: the *petals* are six, of a reddish purple colour, elliptic-oblong, and undulated; the twelve *filaments* are thread-shaped, alternately shorter, and inflected, inserted above the base of the calyx, bearing roundish *anthers;* the *germen* is ovate-oblong, the *style* simple, supporting a capitate *stigma.* The *capsule* is small, elliptical, two-celled, inclosed in the tube of the calyx, and containing several small seeds. Fig. (*a*) the calyx, spread open to shew the stamens, (*b*) the germen, style and stigma, (*c*) the calyx, (*d*) the capsule open, (*e*) the capsule, (*f*) seeds.

This species of *Lythrum* is an indigenous, perennial plant, flowering from July to September. It is found wild on the banks of rivers and ponds, and other moist situations, in almost every country of Europe.

*Qualities, &c.* The dried herb has little or no odour; its taste is herbaceous and sub-astringent. Its active matter is dissolved equally by water and alcohol; the watery decoction is mucilaginous, and strikes a black colour with sulphate of iron; hence it appears to consist chiefly of extractive matter, combined with a small portion of tannin.

*Medical Properties and Uses.* *Loose-strife* is astringent and tonic; it has been chiefly celebrated as a remedy in diarrhœa, for which disorder it has long been a very popular and favorite medicine in Ireland. Störk, De Hean, and other continental practitioners, have also prescribed it with much success, in laxity of the intestines, chronic dysentery, and intermittent fever. In dysentery it has often been found useful; but in most cases it is proper to give some aperient previous to its exhibition. It has been administered generally in the form of decoction, made by boiling two ounces of the dried herb in a quart of water, down to one pint. Of this, two or three ounces may be taken twice or oftener in the day; the powder may be given in doses of one drachm, night and morning. Off. The Herb.

a

b c d

*Rhus toxicodendron.*

G. Sprutt del

# ORD. XXXVII. DUMOSÆ.

## RHUS TOXICODENDRON. PUBESCENT POISON-OAK, SUMACH.

*SYNONYMA.* Hedera trefolia virginiensis. *Park. Theatr.* 679. 5. Arbor trifolia venenata virginiana, folio hirsuto. *Raii. Hist.* 1799. Rhus radicans. *Linn. Sp. Pl.* 381. *Wild. Sp. Pl. I. p.* 1481; *Kalm. Trav. v.* 1. 67. 177. *Ait. Hort. Kew. ed.* 2. *v.* 2. *p.* 163. *Bigel. Med. Bot. Rhus. Toxicodendron. Sept.* 205; *Linn. Sp. Pl.* 381. *Willd.* 1. 1481. *Bot. Mag. v.* 43. *t.* 1806; *Mich. Bor. Am.* 1. *p.* 183. *Ait. Hort. Kew. ed.* 2. *v.* 2. *p.* 164. *t.* 43. *Pursh. Fl. Amer.*

*Class* V. Pentandria. *Ord.* II. Digynia.

*Nat. Ord.* Dumosæ, *Linn.* Terebintaceæ, *Juss.*

*Gen. Char.* *Calyx*, five parted. *Petals*, five. *Berry*, one—seeded.

*Spec. Char.* *Leaves*, ternate. *Leaflets*, petioled, often angled, pubescent *Stem*, frequently rooting.

THIS species of *sumach* is a small *shrub;* seldom exceeding three feet in height. The *root* is woody, fibrous, and horizontal. The *stems*, which are many, divide into slender *branches*, covered with a greyish brown bark. The *leaves* arise alternately upon the branches, supported upon long *petioles*, composed of three broadly, and almost cordate-ovate, pointed leaflets, entire, or lobed and angled, about three inches long, and two broad; the terminal leaflet is considerably larger than the two lateral, which last are nearly sessile, of a deep shining green colour above, glabrous, or sometimes downy beneath.

The *fructification* is dioecious; the *male flowers* are produced in close short spikes, and arise from the sides of the stalks; the *calyx* is composed of five ovate, smooth, caducous leaves; the *corolla* consists of five greenish petals, twice as long as the calyx; the *stamens* are shorter than the petals, attached to the receptacle, and support yellow ovate anthers, excavated by a longitudinal groove. The *female flowers* are produced in loose *panicles;* the *pistil* is composed of a roundish hairy *germen*, supporting a thick, short, smooth style, crowned with three sessile *stigmas*, one of which is usually larger than the rest; the fruit is a striated berry, containing one seed. Fig. (*a*) a male flower, (*b*) the fruit, (*c*) an anther magnified, (*d*) the pistillum.

This species of *sumach* is a native of North America, and very frequent in Carolina; it is also a common tree, in fields and hedges, from Canada to Georgia, flowering in June and July. Botanists have not agreed if this be a distinct species from the *Rhus radicans* of Linnæus: Michaux and Pursh, who had extensive opportunities for observation, consider the *Toxicodendron* and *radicans* as mere local varieties: on the other hand, Nuttall and Elliott agree in opinion with Linnæus, who founds his specific distinction on the leaves of the latter being naked and entire, while they are pubescent and angular in the former. Professor Bigelow, who had opportunities of seeing the plants in every stage, states that, "among the plants which grow abundantly round Boston, I have frequently observed individual shoots, from the same stock, having the characters of both varieties. I have also observed that young plants of *Rhus radicans* frequently do not put out rooting fibres until they are several years old; and that they seem, in this respect, to be considerably influenced by the contiguity of supporting objects. The *radicans* is indeed said to be a smaller shrub, with smooth and slender shoots, roots entire, leaflets smaller, and standing upon shorter and more slender footstalks: but, as far as we can judge from the specimens in our own Herbarium, from various parts of North America, there is no specific distinction between the two.

*Sensible and Chemical Properties, &c.* The leaves of this plant have no odour, their taste is mawkish, and slightly acrid; they give out their virtues completely to water and proof spirit, but only partially to alcohol: the watery infusion reddens litmus paper, and yields a precipitate with gelatine: sulphate of iron produces a black precipitate, and nitrate of silver a brown.

We are told by Professor Bigelow that "if a leaf or stem of this plant be

broken off, a yellowish milky juice immediately exudes from the wounded extremity; after a short exposure to the air, it becomes of a black colour, and does not again change. This juice, applied to linen, forms one of the most perfect kinds of indelible ink; it does not fade from age, washing, or exposure to common chemical agents. I have repeatedly, when in the country, marked my wristband with spots of this juice; the stain was at first faint, and hardly perceptible, but in fifteen minutes became black, and was never afterwards eradicated by washing, but continued to grow darker as long as the linen lasted."*

*Poisonous Effects.* An acrid poison exists in the juice of the *Toxicodendron*, and in many other species of the *Rhus* genus.† The symptoms commonly produced are violent itching, redness, tumefaction of the face and other parts affected; succeeded by vesications, great swelling, heat, pain, and fever.‡ The symptoms often begin in a few hours after the exposure, and when the disease is at its height, the skin becomes covered with a crust, and the swelling is so great, as in some instances to close the eyes, and almost to obliterate the features of the face. The celebrated *Fontana* relates, that having touched at three different times, and at the interval of several days, some leaves of the *Toxicodendron*, he experienced some serious symptoms: some days after, the eye-lids, the extremities of the ears, and almost every part of the face became tumefied, and filled with an aqueous fluid; the spaces which separate the fingers, became red, and were covered with small vesicles, full of transparent humour; the epidermis came off in little scales, and he felt a terrible smarting for the space of a fortnight, and an insupportable itching for a longer period. The disease produced by this poison requires the general antiphlogistic treatment, viz. rest, low diet and evacuations: if the symptoms be very violent, bleeding may be occasionally required, and the usual means resorted to in erysipelatous disorders.

*Medical Properties and Uses.* The leaves of this plant are narcotic, stimulant, and somewhat aperient. It appears to have been introduced into prac-

* Some attempts have been made with a view to ascertain the nature of this colouring principle, and the means of fixing it on stuffs, but without success; the reason of this appears to be that the colouring principle does not reside in the sap, but in a peculiar secretion or *succus proprius* of the plant, and is wholly insoluble in water: hence, some other medium becomes necessary for its solution.

† Viz. *Rhus pumilum, R. typhinum, R. vernix*, &c.

‡ This disease appears to be of an erysipelatous nature.—Ed.

tice by Dufrenoy, a physician at Valenciennes, about the year 1788. His attention was drawn to this subject, by finding that a young man, who had a *dartre* on his wrist, of six years standing, was cured by accidentally becoming poisoned with this plant. It was first brought into notice in this country by Dr. Alderson of Hull, as a remedy for paralysis; and under his direction, it appears to have proved an efficacious remedy. Dr. Alderson relates several cases in which it perfected a cure, and others in which it proved of very considerable benefit. The first symptom of amendment was always a feeling of pricking and irregular twitching in the paralytic limbs; these effects were soon followed by a gradual return of voluntary motion, and feeling in the affected parts.* Dufrenoy administered an extract of this plant in several cases of palsy, four of which, he says, were cured by it. Dr. Givesius relates five cases of paralysis, four of which were cured, by taking the dried leaves of this plant, in doses of one-fourth of a grain twice a day.† The good effect of this medicine, however, in paralysis, does not appear to be generally confirmed; we have pushed it in some cases to a considerable extent without deriving any benefit; and we are told by Dr. A. Duncan, "that he gave it in larger doses, without experiencing the same success; but that it in general operated as a gentle laxative, notwithstanding the torpid state of the bowels in such patients." We are also told by Dr. Alderson, that this plant has been frequently employed in cases of dyspepsia and atonic gout, and with more success than any other tonic; and he further says, "I could easily adduce, from my own practice, and that of several of my friends, a variety of cases of stomach complaints, where it has been highly serviceable." Dr. Horsefield administered a strong infusion of the plant, in doses of a teacupful, to consumptive and anasarcous patients. It appeared to act as an immediate stimulant to the stomach, producing some uneasiness in that organ, also promoting perspiration and diuresis.

From variety of constitution, and those peculiarities which are called idiosyncracies, (which experience alone can fully inform us of) no one can pretend to say to what extent such a medicine as the *Toxicodendron* ought to be administered at first; and as convulsions and other untoward symptoms have been brought on by a too rapid increase of quantity, it is necessary to employ caution in the exhibition of this plant. This uncertainty of

* Vide Essay on the *Rhus Toxicodendron*, by J. Alderson, M.D. 4th edit.

† Bulletin des Sciences Medicales, Sept. 1825.

*Croton Sieglingii*

G. Sprat del.

effect however, though a considerable objection to the employment of *Toxicodendron*, is not peculiar to it, as all the other vegetable poisons are liable to the same inconvenience. The dried leaves have been given in powder, beginning with half a grain for a dose, repeated three times a day, or every four hours, gradually increasing the dose to six, or even more grains, according to the effects produced. We are told by Dr. Alderson, that in some instances the leaves of *Toxicodendron* have lost five-sixths of their weight in drying, in others, four-fifths: hence, the active properties of the powder must vary very considerably. It has also been given in the form of tincture* and extract.

* In the Medical and Surgical Journal for July 1825, p. 82, a case is related, of the good effects of the tincture in palsy; a drop night and morning, increasing the dose to ten drops.

# ORD. XXXIX. TRICOCCÆ.

## CROTON TIGLIUM. PURGING CROTON.

*SYNONYMA.* Pinus indica. *Bauh. Pin.* 492. *n.* 11. — Ricimoides indica. *Flor. Zeyl.* 343.—Ricinus indicus arborescens. *Chom.* i. 61.—Croton Tiglium. *Linn. Sp. Pl.* 1426. *Willd.* iv. 543. *Sp.* 36.

*Class* 21 Monoecia. *Ord.* vii. Monadelphia.

*Nat. Ord.* Tricoccæ, *Linn.* Euphorbiaceæ, *Adr. de Juss.*

*Gen. Char. Male.* *Calyx* cylindrical, five-toothed. *Corólla* of five petals. *Stamens* ten to fifteen.

*Female.* *Calyx* polyphyllous. *Corolla* 0. *Styles* three, bifid. *Capsule* triocular. *Seed*, one.

*Sp. Char.* *Leaves* ovate-acuminate, serrated, glabeous, with two glands at the base. *Petioles* shorter than the leaves. *Racemes* terminal. *Stem* arboreous.

THIS species of *Croton* is a native of Asia, growing in many parts of India, China, the islands of Ceylon, Java, &c. It is a tree of a middling size, seldom exceeding the height of fifteen or twenty feet: the *trunk* and larger *branches* are covered with a soft *bark*, of a blackish colour; the younger branches green, with a reddish tinge. The leaves are alternate, ovato-acuminate, serrated, smooth, and of a bright green colour when old; downy with stellated hairs while young, standing upon *petioles* about one-fourth their length, with two glands seated at their base. The *flowers* are in erect, simple, terminal *racemes*, with downy pedicels. *Calyx* in the *male flower*, cylindrical and five-toothed; the *corolla* composed of five straw-coloured *petals*, very hairy in the drawing in the possession of the East India Company; the *stamens* from ten to fifteen; in the *female flower* the *calyx* is divided into many obtuse segments, which are reflected under the downy *germen;* there is no *corolla;* the *styles* are three and bifid; the *capsule* rather bigger than a hazel-nut, trilocular, smooth, and containing three *seeds*. *Fig.* (*a*) represents a raceme of male flowers; (*b*) a capsule; (*c*) a section of the capsule; (*d*) a seed.

The genus *croton* contains upwards of 150 species, of which the *Tiglium* is the only one possessing purgative qualities. In Europe, the seeds have been long known under the names of *Grana Molucca* and *Grana Tiglii;* the former of which names, seems to have been derived from the Molucca islands, whence the seeds were formerly exported into Europe. It appears that the natives of the Eastern nations have for centuries past been well acquainted with the purgative effects of the seeds; and in Europe they were formerly prescribed as a drastic purge, but fell into disuse on account of the very violent somptoms and untoward accidents frequently produced by their use. In this country, the fixed oil, expressed from the seed, has been lately brought into general use, through the exertions of Drs. Conwell and Nimmo, Mr. Frost, and others.*

* The *oil of Croton* was introduced into Europe in the year 1630, and employed internally with success by several physicians. In 1632, Artus Gyselius extolled it in dropsy.

QUALITIES AND CHEMICAL PROPERTIES, &c. *Oil of Croton* is of an orange or deep yellow colour, with a peculiar odour, *sui generis*, and an extremely acrid and pungent taste. Dr. Nimmo of Glasgow, found 100 parts of this oil to consist of 45 per cent. of an acrid purgative principle, soluble in volatile and fixed oils, alcohol and sulphuric ether; and 55 per cent. of a bland oil, (resembling oil of olives) insoluble in alcohol. According to the experiments of Mr. Frost,* one hundred grains of the seeds consist of thirty-two shell, sixty-eight kernel. On digesting one hundred grains of the seeds in three drachms of sulphuric ether, sp. grav. seventy-one, afforded twenty-five grains of fixed oil. Thirty-two grains of the oil were put into a Florence flask, containing some alcohol previously digested on olive oil, to prevent the spirit from dissolving any of the oil of the *Croton Tiglium* seed. The mixture was now agitated, and then passed through a filter containing carbonate of ammonia; the filtered solution was then evaporated without heat, and yielded—active matter, (soluble in alcohol and ether) combined with a very small portion of fixed oil, 8—5 grs., inert fixed oil, 23.5,— 32 grs.

It appears the *Croton oil* of commerce is usually very much adulterated, either with the oil of olives or castor, and differing in strength ten-fold; the consequence of prescribing a medicine of such unequal powers must be obvious. Dr. Nimmo has made some experiments, for the purpose of detecting this fraud. Dr. Nimmo digested the suspected oil in alcohol, which will dissolve a less proportion of the Croton oil, if adulterated with olive oil; and a larger proportion if mixed with castor oil; but it is evident, the test must fail, if the adulteration be with a combination of both.

MEDICAL PROPERTIES AND USES. Every part of the *Croton Tiglium* tree is said to possess medical properties. We are told, that in the Eastern nations,† it is valued for its purgative, diaphoretic, and diuretic properties; the roots, as well as the seeds, are powerfully cathartic, and used in Batavia and other parts as a specific for dropsy; the wood of the trunk and branches, in small doses, acts upon the skin and kidneys; and the leaves, in powder,

In the *Herbarium Amboinense* of Rumphius, published at Amsterdam, 1750, by Burmann, a description of the *Croton* is given; the seeds of which, we are told, yield, on expression, an oil, which, when taken in the dose of one drop in Canary wine, was, at that time a common purgative.

* See Observations on the properties and effects of the seeds of Croton Tiglium.

† Vide Ainslie's Materia Indica of Hindostan.

are used by the Japanese, as a topical remedy for the bites of serpents. In this country, the expressed oil is the only part medicinally employed, and when genuine, generally proves powerfully cathartic, in doses of from one to two minims; its effects are commonly very rapid, often supervening at the expiration of half an hour; and in cases of obstinate constipations, when other medicines have failed, it will be found a valuable remedy. In using this oil, the greatest caution will be required, and we would by no means recommend a repetition of the dose, for at least some hours. The safest way of administering the *Croton oil*, is in combination with other aperients. Where patients are incapable of swallowing, a drop or two, let fall upon the tongue, will in general operate powerfully; and we are told, that a few drops rubbed round the umbelicus, have produced purgative effects.* The following we have found an useful formula for the exhibition of this oil:—℞ Ol. Tiglii, m. ij; Pilul. Colocynth. ℈ij. Ft. massa et divid. in pilul. decem. From two to three of these pills may be given every two, three, or four hours, until the desired effect is produced.†

Off. Oil of Croton or Tiglium.

* Ainslie's Materia Medica.

† One of the best modes of exhibiting the *Ol. Tiglii,* is in combination with the *Ol. Papav.* or *Ol. Amygdal.* in the proportion of one drop of the former to an ounce of either of the latter; the mode recommended in Hufeland's Journal der practischen Heilkunde, for making artificial castor oil.

## EUPHORBIA OFFICINARUM. OFFICINAL EUPHORBIUM, OR SPURGE.

*SYNONYMA.* Euphorbii tenella planta. *Lob. Ic.* ii. *t.* 25. *Advers. v.* ii. *t.* 28. Euphorbium. *Tabern.* 104. *Raii Hist.* 872; *Bauh. Pin.* 387. *Blackw. Trew. Cent.* iii. *t.* 340. *f.* 2. Euphorbium polygonum spinosum cerei effigie. *Isn. Act. Acad. Scien.* 1720. *p.* 385. *n.* iv. *t.* 10. Euphorbia officinarum. *Linn. Sp. Pl.* 647. *Willd. v.* ii. 884. *Amœn. Acad.* iii. *p.* 107. *Plenck. Icon. t.* 365. *Decand. Pl. Grasses, t.* 79. *Ait. Hort. Kew. ed.* 2. *v.* ii. *p.* 157.

*Euphorbia officinarum.*

G. Sprott del

*Class* XXI. Monoecia. *Order* I. Monandria. (Dodecandria, Trigynia, *Lin.*)

*Nat. Ord.* Tricoccæ, *Lin.* Euphorbiæ, *Juss.* Euphorbiaceæ, *Adr. Juss.*

*Gen. Char.* Involucre, of one piece, including several barren flowers, and one fertile. *Barr. Fl.* A single stamen, without calyx or corolla. *Fert. Fl.* A single pistil, without calyx, (or, rarely, a very minute one) or corolla. *Germen* three-lobed; *styles* three-cleft; *capsule* three-seeded.

*Spec. Char.* Aculeated, naked, many-angled; *prickles* in pairs, spreading, equal.

THE *stem* of this plant rises four or five feet in height, simple, or branched towards the top, erect, angled, or furrowed with eight or more longitudinal fissures; the *branches* go off first horizontally, and then ascend; they are more distinctly angled than the stem, the angles notched, and furnished with prickles, which are every where in pairs; these branches are every where destitute of leaves. The *involucres* are sessile, and arise at the extremities of the branches, in the axils of the spines. The *involucre* is monophyllous, bell-shaped, persistent, and divided into eight or ten teeth or segments, of which the four or five outer are thick, yellow, obtuse, spreading; four or five alternate and inner ones, smaller, obtuse, entire, and directed inwards. *Barren* or *male flowers* about twelve, each consisting of a single capillary *filament*, which supports a globular, two-lobed *anther*. *Fertile* or *female flower*, a single naked pistil; the *germen* roundish, three-lobed, supporting a short, simple *style*, crowned with three spreading obtuse *stigmas*. The *capsule* is tricoccous, elastic, and contains three roundish *seeds*. Figure (*a*) represents the flower, (*b*) the germen and styles.

The genus *Euphorbia* comprises a very numerous tribe of singular plants. Upwards of 200 species are described by authors, and 120 are cultivated in our Botanic gardens.* The *Euphorbia officinarum* is a perennial, shrubby, and very succulent plant; a native of Africa, where it grows in great abundance. It is the Δένδρον εὐφορβίον of Dioscorides, and derived its appellation from Euphorbius, physician to Juba, king of Lybia, who named it in honour of his physician.† This plant was first cultivated in Britain about the year

* Fourteen species of this genus are natives of Britain.

† Antonius Musa and Euphorbus were brothers; the former, physician to Augustus Cæsar, the latter to Juba, king of Lybia. Cæsar raised a statue to Musa—Juba named

1597. The *officinal euphorbium* of the shops is the concrete juice of this plant, obtained by making slight incisions in the branches with a knife, from which a milky juice exudes, which by exposure to the air soon becomes solid. The recent juice is so corrosive as to erode the skin wherever it touches, and the people employed to gather it are obliged to tie a cloth over their mouths and nostrils, to protect them from the acrid dust of the withered branches. We are told by Bruce, that "when the tree grows old, the branches wither, and in place of milk, the inside appears to be full of powder, which is so pungent, that the small dust which he drew upon striking a withered branch, seemed to threaten to make him sneeze to death; and the touching the milk with his fingers, excoriated them, as if scalded with boiling water." In the lower regions of Mount Atlas the inhabitants collect the gum-resin, (which they call *furbiune*) in September; the quantity yielded is so considerable that they are cut only once in four years, the produce then obtained being sufficient to supply all Europe for that space of time: the concrete juice imported into Europe, however, is the produce of several species of this genus, many of which furnish a similar acrid juice to the *officinarum;* among which are, the *Euphorbia antiquorum* and *Euphorbium canariensis* of Willdenow. *Euphorbium* is brought to this country immediately from Barbary, in packages containing from 100 to 150 lbs. weight.

*Sensible and Chemical Properties.* This concrete juice is in the form of small drops of an irregular shape, externally of a pale yellow colour, but whitish within, and breaks readily between the fingers. It is inodorous, and when first chewed, has little taste, but soon gives a very acrid, burning sensation to the mouth and fauces, which is very permanent. When triturated with water, it renders it milky, but only one part in seven of the *Euphorbium* is dissolved. It is soluble in ether, alcohol, oil of turpentine, oil of almonds, and partially so in acids and alkalies. Alcohol takes up one part in four, and forms a clear, straw-coloured solution, which is rendered milky by the addition of water. When the ethereal tincture is evaporated on water, it leaves on the side of the glass a pellicle of transparent resin, resembling an officinal plaister. When ignited, it burns with an agreeable odour and a bright flame. Its specific gravity is 1,124. According to Braconnot, 100 parts of Euphorbium contain 37,0 of resin, 19,0 wax, 20,5 malate of lime, 2,0 malate of potass, 5,0 water, 13,5 woody matter, and 3,0 loss.

this plant after Euphorbus.—"Ubi jam Musæ statua? Periit! evanuit! Euphorbi autem perdurat, perennat, nec unquam destrui potest."—*Crit. Bot.* 89.

*Poisonous Effects.* *Euphorbium* is ranked by toxicologists among the acrid poisons, and when taken inwardly, it produces the general effects of this class of vegetable poisons,—viz. violent vomiting and purging, accompanied with great pain in the stomach and bowels, strong and frequent pulse, quick and difficult respiration, appearance of intoxication: pupil of the eye frequently dilated, insensibility and death. Orfila made many experiments on dogs, to ascertain the effects of Euphorbium on the animal economy, and from them has drawn the following conclusions: — First, that *Euphorbium* exerts a local action extremely violent, capable of producing acute inflammation. Secondly, that its fatal effects depend rather on sympathetic irritation of the nervous system, than on its absorption Thirdly, that it acts on the human species as on dogs.*

Many other species of *Euphorbia* are equally violent in their effects as the *officinarum*— viz. *Euphorbia Antiquorum*, *palustris*, *hyberna*, *amygdaloides*, *platyphyllos*, *verrucosa*, *canariensis*, *mauritanica*, *neriifolia*, *exigua*, and *Esula*. We are told by Scopoli that the *Euphorbia Esula* produced death in a woman, in half an hour after she had swallowed thirty grains of the root; and also that he witnessed gangrene and death to follow the application of the same plant to the abdomen.

*Medical Properties and Uses.* *Euphorbium* is powerfully cathartic, emetic, and errhine; formerly it was given as a hydragogue in anasarcous and other disorders requiring the aid of powerful remedies; but its effects are so violent, even when exhibited in small doses, that it is now seldom prescribed as an internal medicine. When used as an errhine, it requires to be diluted with starch or some other inert powder; for if taken alone, its action is so violent as to produce inflammation and hæmorrhage; but when properly di-

* In the Philosophical Transactions for 1760, the following case is recorded, of a Mrs. Willis, who took by mistake two ounces of the tincture of *Euphorbium*, prepared with two drachms of camphor and two of *Euphorbium* to two ounces of rectified spirit. Immediately after, she experienced a violent suffocation, attended with a burning heat in the mouth and stomach; large draughts of warm water were immediately exhibited, which produced copious vomiting; the burning pain at the stomach continuing, she was ordered to drink oil and water alternately; the vomiting continuing, an ounce of ipecacuanha wine was administered, which caused copious evacuations from the stomach and bowels; after which, an opiate and mild diluents soon produced tranquillity. The violent effects produced by the tincture of *Euphorbium* in this case, must be partly attributed to the camphor.

luted, it has been found efficacious in lethargy, paralysis, amaurosis, deafness, &c. Several other species of *Euphorbia* have also been used medicinally, with good effect. The *Euphorbia corollata* is a pretty certain purgative, in doses of from ten to five grains; double the quantity proves emetic, and generally acts without much violence. The *Euphorbia Ipecacuanha* is also emetic, in doses of fifteen or twenty grains. The seeds of the *Euphorbia Lathyrus* are also both emetic and cathartic, and have been proposed as a substitute for Ipecacuanha. The juice of the *Euphorbia helioscopia* is an useful escharotic for destroying warts. Officinal, Euphorbium.

---

## STALAGMITIS CAMBOGIOIDES. THE GAMBOGE TREE.

---

*SYNONYMA.* Stalagmitis cambogioides. *Murry App. Med.* iv. 645. *Plenck, Icones Plant. Med. t.* 421; *Willd. Sp. Pl.* iv. 980; *De Cand. Prodr. v.* 1. *p.* 562.

*Class.* Polygamia. *Ord.* Monœcia.

*Nat. Ord.* Tricoccæ, *Linn.* Guttiferæ, *Juss.*

*Gen. Char.* *Calyx*, four-leaved. *Corolla*, four-petaled. *Stamens*, thirty, inserted into a fleshy, four-cornered receptacle. *Style*, thick. *Stigma*, four-lobed. *Berry*, one-celled, crowned by the *style* and *stigma.*

*Spec. Char.* O.

THE *Stalagmitis cambogioides* is a middling-sized *tree; branches* opposite and divaricated: the *leaves* are opposite, ovate, entire, smooth, coriaceous, rigid, and supported on short *petioles:* the *flowers* are *hermaphrodite* and *male;* the *hermaphrodite flowers* are in axillary or lateral *whorls:* the *male flowers* are either in distinct clusters or mixed with the hermaphrodite; the *calyx* in the male flowers consists of four ovate *leaflets*, the two exterior of which are smaller than the two interior; the *petals* are four, spreading, coriaceous, with ciliated margins, and of a yellow colour: the *stamens* are about thirty, and placed upon a quadrangular, fleshy, *receptacle:* the *anthers*

*Stabagmitis cambogioides.*

G. Spratt del

are club-shaped; sometimes there are rudiments of a *style*, and an unequal, sterile, *stigma:* the *calyx*, *corolla*, and *stamens* of the hermaphrodite flowers, resembling those of the male: the *germen* globular, and supporting a short *style*, crowned with a three or four-lobed *stigma*, the lobes of which are obcordate and persistent: the *fruit* is a smooth, globular, yellow, *berry*, crowned by the style and lobes of the stigma, and containing several long, trianglar seeds. Fig. (*a*) section of the fruit; (*b*) a seed.

This tree is a native of the kingdom of Siam and Ceylon, where it is known by the names of *Ghokata*, *Gokkata*, or *Gohlata*. Kœnig, who resided many years at Siam, clearly ascertained that the *Stalagmitis* is the tree that affords the genuine *Gamboge*. But this tree is not the only plant which yields that substance, although it is probable the greater part of what is brought to market, is the product of that tree. The *Gambogia gutta*, *Garcinia celibica*, *Hypericum pomiferum*, and many other plants, yield a yellow gum-resin, resembling in every respect the gamboge of the shops.

*Gamboge* is obtained by wounding the bark of the tree with sharp stones, or by breaking off the leaves and young shoots; the former mode is usually practised in Ceylon, and the latter at Siam. It is said to be first collected in cocoa-nut shells, and thence poured into the joints of the bamboo (which gives it the cylindrical form) or into earthen vessels, where it remains until it becomes sufficiently dry to be rolled into masses, when it is wrapped up in leaves, the state in which it is usually imported. *Gamboge* was first brought to Europe about the middle of the seventeenth century: it comes packed in cases or boxes.

*Sensible and Chemical Properties, &c.* *Gamboge* has little or no odour, and scarcely any taste; when pure,* it is of a golden yellow colour, opaque, and breaks with a vitreous fracture; its specific gravity is 1,221; exposed to heat, in a ladle, it slowly softens, but does not smoke, nor melt, but by degrees grows black, and changes into a soft, toughish, black mass. When applied to the flame of a candle, it takes fire, and burns with a bright, crackling, sparkling, flame, with smoke; at first it softens, then partly melts and drops, and the remainder grows black, swells, and is changed into a shining, friable charcoal. *Gamboge*, when macerated in water, forms a fine turbid yellow solution, and about two-thirds of its substance is dissolved;

* It is generally, more or less mixed with sand and other impurities.

the solution is not precipitated by alcohol; but rendered transparent: oxy-sulphate of iron strikes with it a pale olive brown, but causes no precipitate, nor is it affected by solutions of any of the other metallic salts. Alcohol dissolves about 90 per cent; the solution, after settling for some time, becomes transparent and deep yellow; water renders the tincture cloudy and bright yellow, but it is long before any precipitation takes place. Ether dissolves 60 per cent.; the solution is transparent, and of a deep golden colour: when evaporated on water, it leaves an orange-coloured resin, which does not colour water. In strong solutions of ammonia and potass, it forms with them deep red solutions, which are not rendered turbid by the addition of water; with weak acids, yellow precipitates are produced, which are taken up again by adding the acid to excess. Gamboge was separated by Braconnot into one part cerasine or tragacanthine, and four of a reddish brittle resin, which dissolves in spirit of wine and the alkalies; these experiments, however, do not throw any light upon the cathartic property of gamboge.

*Medical Properties and Uses.* *Gamboge* is a drastic cathartic, acting powerfully upon the alimentary canal: even when administered in small-doses, it often produces vomiting, hypercatharsis, and other untoward symptoms. Orfila has given it a place amongst the acrid poisons, and infers, from his experiments made on animals, that it occasions death by the powerful local action which it exerts, and by the sympathetic irritation of the nervous system.* When administered with due caution, gamboge often proves a successful hydragogue in dropsy, either alone, or in combination with cream of tartar or jalap; it has also been given with success for expelling tæniæ, and is probably the active ingredient in most nostrums sold for that purpose. For destroying the tape-worm it has been given to the extent of fifteen or twenty grains, combined with an equal quantity of vegetable alkali: this dose is ordered to be taken in the morning, and if the worm be not expelled in two or three hours, it may be repeated a second or third time with safety, and often with efficacy. It is also frequently administered with success in cases of obstinate costiveness, either alone, or combined with calomel, jalap, or rhubarb.

Off. The Gum Resin.

Off. PP. Pilulæ Cambogiæ Compositæ, L.E.

* Orfila's Toxicology, vol. ii. p. 24.

*Rheum undulatum*

C. Spratt del.

# ORD. XL. HOLERACEÆ.

## RHEUM UNDULATUM. WAVED-LEAVED, OR CHINESE RHUBARB.

*SYNONYMA.* Acetosa montana. *Messerch.m. in Am. Ruth.* 226. Rheum sinense. *Amm. Herb.* 206. Rheum Rhabarbarum. *Linn. Syst. Veg.* 385; —*Pallas, It.* 2. 559. Rheum undulatum. *Linn. Sp. Pl.* 531; *Amœn. Acad.* 3. *p.* 212. *t.* 4; *Willd.* 2. 489; *Hort. Kew, ed.* 2. *v.* 2. *p.* 430; *Plenck. Ic. t.* 321.

*Class.* Enneandria. *Ord.* Trigynia.

*Nat. Ord.* Holeraceæ, *Linn.* Polygonea, *Juss.*

*Gen. Char.* Calyx, O. *Corolla*, six-cleft, persistent. *Seed*, one, three-sided.

*Spec. Char. Leaves*, villous, wavy; the sinews dilated at the base. *Petioles*, flat above, with an acute edge.

THIS species of *Rhubarb* is a native of China, Siberia, and Tartary; and was supposed by Boerhaave to be the plant which yields the true *Chinese* and *Turkey Rhubarb*.* The *root* of this plant is divided into a number of

* Another species of this genus, the *Rheum compactum*, a native also of Tartary, possesses similar medicinal properties, and the roots resemble those of the *Rheum undulatum*; hence, it is most probable, that the markets are supplied indiscriminately from both species. The Rheum Australe, described by Don,—*Prodr. Fl. Nepal. p.* 75, and figured by Sweet in the British Flower Garden, is now considered by many to be the true Officinal Rhubarb.

thick fibres, which run deep into the soil and are of a bright golden yellow colour internally: the *leaves*, which appear early in the spring, are numerous, large, oblong, somewhat tapering, villous above, much waved at their edges, strongly veined beneath, and supported upon moderately thick *footstalks*, which are furrowed on their under side, and plane on the upper. The *flower-stem* is of a pale brownish colour, about four feet high, and dividing into several loose *panicles* of white *flowers;* these are succeeded by triangular *seeds*, which ripen early in the season: the other parts of the fructification resemble those of the *Rheum palmatum*. Figure (*a*) a flower, (*b*) the seed, (*d*) the pistil.

The *Rheum undulatum* and *Rheum palmatum** have both been successfully grown on a large scale in this country. We presume the following account of the culture of so valuable a drug will not be uninteresting to our readers. The seeds are sown in March or April, or during the Autumn, in August or September; the former to be transplanted in Autumn, the latter in Spring. Instead of placing the seedling plants where they are to remain, as is usually recommended, beds should be prepared, resembling those which are made for asparagus, of fine mould, from twelve to eighteen inches deep. When the young plants are four or five inches high, and have thrown out as many leaves, transplant them upon those beds, at eight inches asunder; selecting first the largest, carefully drawing them out, so as neither to destroy, nor even scarcely to disturb the fibres. Watering the bed previously to the removal, will greatly facilitate the operation."

In the culture of *rhubarb*, the whole difficulty consists in bringing the plants through the first season; if the weather be hot and sultry, they must be shaded, and at all events, continually watered. For transplanting, a wet or cloudy day should be preferred; and if the weather should continue wet for two or three days successively, not more than four or five in a hundred will probably be lost. In a month the roots will have made fresh shoots, and new leaves will have succeeded the former, which commonly, notwithstanding all our care, will wither away. The plants may now remain till the ensuing Spring; or if the Summer be favourable, and the land intended for the plantation be well trenched, three feet deep, the removal may be completed without delay. It is a good way, to sow the ground with carrots; the

* This species of *Rheum* will be found figured in Vol. IV. of this work.

surface by this means being preserved from weeds, and rendered finer by repeated hoeings, and the bottom kept light and open.*

In the choice of situation, the aspect is not very material, provided it be not too much towards the south or west. The indispensable points are, the depth and quality of the soil, which should be light, loamy, and rich, but not too much so, lest the roots should be too fibrous; it can scarcely be too dry, for more evil is to be expected from a superabundance of moisture, than from any actual want of it. A declivity is very eligible for the plantation. When a plantation does not possess this material advantage, narrow beds and deepened trenches are among the artificial means that should be adopted; but most situations will require some care to prevent the ill effects of water remaining on the crowns of the plants; therefore, when the seed-stalks are cut off (which ought always to be done on the withering of the radical leaves) they should be covered with mould in the form of a hillock. This will answer two good purposes,—that of throwing off the rain, and keeping open the trenches, by taking the earth from them.

Mr. R. Davis, Jun. of Minehead, recommends the seeds to be sown in a very gentle hot-bed during March, and when the roots are about the size of a crow's quill, they should be drawn up carefully, to preserve the tap-root, and planted in a fine rich earth in a deep soil; if the weather proves dry, they must be watered. When the plants are once in a growing state, all further care and trouble are at an end, but that of keeping them free from weeds. The distance between the plants should be eight feet. We are told by Mr. Salisbury of the Fulham Road, Middlesex, that "Rhubarb grows well in light, loamy soils; it blooms at the age of three years, and ripens abundance of seeds, by which the plants are raised. The propagation, requiring particular care and attention, should be considered more the work of a nurseryman than that of the farmer; and if a sale were found for a quantity, they could be raised, fit for planting out, at five shillings per hundred.

"The land intended for this crop should be trenched as deep as it will bear, without throwing up a bad under-soil, and the plants set at exact squares, three feet apart; so that 4,840 will just plant an English acre. During the Summer season the land must be frequently hoed, and at the Autumn or Winter it should be every season dug, and particular care paid

* Trans. Art. 15, 167.

to throw the mould up to the roots. By observing this plan during the Winter, and raking off in Spring, the growth will be much encouraged. Unless it be necessary for the purpose of saving seeds, none of the plants should be allowed to throw up blooming stems, which, on their first appearance, should be cut down; otherwise the plants are weakened at the root.

"The crop must stand seven years on the land; and, in fact, experience proves that the roots will keep increasing in size till a much older date, so that it might be taken up after that period, at such time as best suited the market, or the proprietor's pleasure." The quantity in weight of the roots, at the end of seven years, will consequently vary according to circumstances; but from an experiment made this present Autumn, the writer is warranted in the supposition, that from one acre, *five thousand pounds' weight* may at least be expected of *prime Rhubarb*, besides a quantity that would find sale for inferior purposes to the druggists—as extract, tincture, &c. The labour attending this crop, from the distance which the plants are apart, is very trifling, and would require less expense, than in crops where the plants stood thicker, as in madder, &c. where the *hoeing* and *weeding* is more tedious. The expense would be in Ireland as follows:—First year——

| | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|
| Rent of one acre, or 160 perches | 2 | 0 | 0 | | | |
| Five thousand plants at 50*s.* | 12 | 10 | 0 | | | |
| Trenching, at 5*d.* per rood | 3 | 6 | 8 | | | |
| Planting | 1 | 0 | 0 | | | |
| Hoeing three times, at 7*s.* per acre each time | 1 | 1 | 0 | | | |
| | | | | 19 | 17 | 8 |
| Second year— | | | | | | |
| Rent | 2 | 0 | 0 | | | |
| Digging, (a man) the plants at 2*d.* per rood | 1 | 6 | 8 | | | |
| Hoeing three times | 1 | 1 | 0 | | | |
| | | | | 4 | 7 | 8 |
| Ditto for five following years | | | | 21 | 18 | 4 |
| | | | | £46 | 3 | 8 |
| Trenching land to take up crop at 1*s.* per perch | | | | 8 | 0 | 0 |
| Repairing & drying the crop, at 2*d.* per lb.—5000lbs. | | | | 20 | 16 | 8 |
| Tithe, seven years, at 8*s.* | | | | 2 | 16 | 0 |
| | | | | £77 | 16 | 4 |

From the above calculation, we may readily estimate the profitable return to the cultivator of a rhubarb crop—fine specimens of English Rhubarb fetching from five to six shillings per pound. We are informed that the London market is chiefly supplied from Banbury. English rhubarb is equally purgative as the foreign, but less astringent and tonic.

*Chemical Properties, &c.* Boiling water dissolves about 40 per cent. of *Turkey Rhubarb*, the infusion is limpid, of a deep yellow or orange colour, changing to a greenish black with sulphate of iron, and yields a scanty precipitate with lime-water, solution of acetate of lead, and oxymuriate of mercury. Spirit of wine takes up 27 per cent.; the solution is of a golden yellow, not altered by adding water, but changing to dark olive green by sulphate of iron. Ether dissolves 15 per cent.; the tincture is of a gold yellow colour, and on evaporation, leaves a yellow resin. East India Rhubarb is bitterer to the taste than that from Turkey, its grain is more compact and smooth, and when powdered, it is of a deeper colour. Water dissolves 50 per cent.; the infusion is thick, and affords more precipitate, on adding a solution of isinglass, than that of Turkey Rhubarb; it also yields a copious precipitate with lime-water, solutions of corrosive sublimate, or sugar of lead.* Alcohol takes up 40 per cent.; the solution is clear, of a brownish yellow, is rendered slightly turbid by the addition of water, and yields a copious dark green precipitate with sulphate of iron. Ether dissolves only 2 per cent. By digesting the remains of the infusion in muriatic acid, and afterwards adding spirit of sal-ammoniac, oxalate of lime is precipitated. Turkey Rhubarb yields about 43,3 per cent., and East India 30, of this oxalate.

The following constituents were obtained from one hundred parts of fine Turkey Rhubarb:—

| | |
|---|---|
| Resin | 10 |
| Gum | 31,0 |
| Extract, tan, and gallic acid | 26,0 |
| Phosphate of lime | 2,0 |
| Malate of lime | 6,5 |
| Woody fibre | 16,3 |
| Water | 8,2 |
| | 100,0 |

* Grey's Elements.

It is generally supposed that Rhubarb contains some oxalate of lime;—Mr. Brande, however, has never succeeded in obtaining oxalic acid from it, but he has obtained an uncrystallizable acid, having the characters of the malic acid. M. de Lassaignes, however, imagines, that the acid termed *rheumic* by Mr. John Henderson,* is the oxalic acid.

The following tables, by Dr. Anthony Todd Thomson, show the effects of various re-agents on the aqueous infusions of the two varieties of rhubarb.—

* Annals of Philosophy.

TABLE I.—Precipitates formed by Acids, Alkalies, and Neutral Salts.

| *Variety of Rhubarb* | *Sulphuric acid.* | *Nitric acid.* | *Muriatic acid.* | *Oxymuriatic acid.* | *Solution of Potass.* | *Solution of Sub-carbonate of Potass.* | *Lime Water.* | *Muriate of Barytes.* | *Silicated Potass.* |
|---|---|---|---|---|---|---|---|---|---|
| Russian. | Copious greenish yellow. | Scanty, flocculent, pale yellow. | Scanty, very slowly formed yellow. | Slowly formed pale olive. | None, but strikes a deep lake colour. | None, but strikes reddish brown. | Scanty, slowly formed, brown. | Scanty, olive green. | None, but strikes a deep brown. |
| Chinese. | More copious brownish yellow. | Less scanty, pale yellow. | Scanty, quickly formed, brownish yellow. | Slowly formed orange yellow. | None, a deeper lake. | None, but renders it turbid, & deep reddish brown. | Copious, quickly formed brown. | Less scanty orange yellow. | None, but strikes a deep brown. |

TABLE II.—Precipitates formed by Solutions of Metallic Salts.

| *Variety of Rhubarb.* | *Solution of Oxysulphate of iron.* | *Solution of of Nitrate of silver.* | *Solution of Nitrate of Mercury.* | *Solution of Nitrate of lead.* | *Solution of Muriate of Mercury.* | *Solution of Acetate of lead.* | *Solution of Tartarized Antimony.* |
|---|---|---|---|---|---|---|---|
| Russian. | Copious, nearly black. | Scanty, pale greenish yellow. | Copious, olive yellow. | Scanty, slowly formed yellow. | Scanty, quickly formed, heavy yellow. | Scanty, greenish yellow. | Scanty, slowly formed, whitish. |
| Chinese. | Copious, deep olive green. | Copious, orange yellow. | Copious, heavy bright yellow. | Scanty, slowly formed, deeper yellow. | Copious, slowly formed, pale yellow. | Copious yellow. | Scanty, still more slowly formed. |

For the *Medical Properties and Uses of Rhubarb*, see *Rheum Palmatum*, Vol. IV. of this work.

# LAURUS CASSIA. CASSIA TREE.

*SYNONYMA.* Laurus Cassia. *Linn. Sp. Pl. p.* 528. *Wild. Sp. Pl. p.* 477. *Burm. Ind. p.* 91. *Lam. Encycl.* 3. *p.* 441. *Illustr. t.* 321. *f.* 2. *Bot. Mag. t.* 1636. Laurus Canella, *Mill. Dict. n.* 12. Cinnamonum perpetuo florens, folio tenuiore acuto. *Burm. Zeyl. p.* 63. *t.* 28. Cassia lignea. *Blackw. Herb. t.* 391. Cinnamonium, seu Canella Malabarica, seu Javanensis. *Bauh. Pin.* 409. Carua. *Hort. Mal. v.* 1. *p.* 107. *t.* 59. Persea Cassia. *Spreng. Syst. Veg. v.* 2. *p.* 267.

*Class*, Enneandria. *Ord.* Monogynia.

*Nat. Ord.* Holeraceæ, *Linn.* Lauri, *Juss.*

*Gen. Char.* *Calyx*, O. *Corolla*, resembling a calyx, six parted. *Nectary* of three two-bristled glands, surrounding the germen. *Interior filaments*, glanduliferous. *Drupe*, one-seeded.

*Spec. Char.* *Leaves*, ovato-lanceolate, three-nerved, acute, the younger ones coloured; *peduncles* trichotomously panicled and very spreading.

THIS species of *Laurus* is a native of Malabar, Sumatra, Java, and Ceylon: it is a lofty *tree*, rising to the height of fifty feet, and gives out numerous large *branches*, which spread horizontally; the *trunk* and *branches* are covered with a greyish brown bark; the *leaves* are ovate lanceolate or elliptical, entire, smooth, from four to six inches long, longitudinally nerved, of a bright green colour on the upper surface, paler beneath; when young of a delicate red colour; the *flowers* are produced in axillary *clusters*, six together, on slender flower-stalks; the *corolla* is monopetalous, small, white, and divided into six stellated teeth; the *fruit* is an ovate, oblong, black *berry*, with a mucronate *apex*, it contains a somewhat bitter pulp, and when dried is insipid and without smell.

*Faurea rosea.*

C. Spratt del.

The *cassia tree* arrives at its greatest perfection in exposed situations, on a high altitude and dry soil. The *bark* of those trees which grow in moist and shady situations is said to be of an inferior quality; the larger branches and the trunk, we are told, are the parts of the tree from which the bark is taken, and the cuticle only appears to be scraped off; and from the larger branches it is thick, of a spongy texture, and full of slimy mucus. We are informed by Mr. Marshall, (*Annales de Phil. vol.* x. *p.* 245.) that the *cassia-buds* of commerce are not the produce of the cassia tree, but the fleshy receptacle of the seed of the *Laurus Cinnamomum*, and that they are not prepared at Ceylon, but come chiefly from China, through Madras, Calcutta, or Bombay. *Cassia* is imported into this country in packages, denominated chests, half-chests, or quarter-chests. The inferior or third sort of cinnamon prepared in Ceylon, is said to be imported into England and sold as cassia.

*Qualities, &c.* *Cassia bark* has a pleasant, fragrant odour, very much resembling that of cinnamon, but less powerful; its taste is pungent, aromatic, and somewhat sweet, appearing slimy when much chewed, of a reddish-brown colour, in pieces more or less quilled, but much less so than cinnamon; about one-tenth of an inch in thickness, internally of a fine, smooth texture, externally of a paler colour, and somewhat spongy. The watery infusion is reddish coloured, has the odour of the bark; taste sweetish and somewhat astringent; sulphate of iron changes it to a deep brown; the spirituous solution is of a deep red-brown colour, and yields an aromatic extract by distillation. The distilled water is fragrant, aromatic, and slightly astringent. Cassia, by distillation with water, yields an essential oil, similar to that of cinnamon, on which its qualities depend; it requires a strong heat to carry it over, and separates very slowly from the distilled water. The *buds of cassia* yield an oil similar to the bark, which is often sold for the oil of cinnamon; one pound of cassia bark, or buds, yields from one to two drachms of oil.

*Medical Properties and Uses.* The bark and buds of cassia are stomachic, tonic, and cordial, and may be used as a substitute for cinnamon bark,* in doses of five grains to one scruple, in all cases in which cinnamon may be indicated.

* In pharmacy, the druggists usually employ cassia bark, or buds, in the preparing tinctures, extracts, cinnamon-water, &c.

# ORD. XLI. SCABRIDÆ.

## HUMULUS LUPULUS. THE HOP.

*SYNONYMA.* Lupulus salictarius. *Fuch.* 144; *Plin. Hist. Nat.* l. 21. *n.* xv. *Ger. Em.* 885. Lupulus. *Camer. Epit.* 933-4; *Dod. Pempt.* 409. i.; *n.* 1618. *Hall. Hist.* Lupulus, mas. et fæmina. *Bauh. Pin.* 299. 1, 2; *Raii Hist.* 156. Lupulus, seu sativus, seu sylvestris. *Park.* 176; *Trag.* 812. Humulus Lupulus. *Linn. Sp. Pl.* 1457; *Willd. v.* iv. 769; *Eng. Bot. t.* 427; *Flor. Brit.* 1077; *Sm. Engl. Fl. v.* iv. *p.* 240; *Hook. Fl. Scot.* i. *p.* 288; *Hook. Br. Fl. p.* 436.

*Class* Dioecia. *Order* Pentandria.

*Nat. Ord.* Scabridæ, *Linn.* Urticeæ, *Juss.*

*Gen. Char.* Male. *Calyx* five-leaved; *corolla* O; *anthers* with two pores.

Female. *Scales* of the *catkin*, large, concave, oblique, entire.; *corolla* O; *styles*, two; *seed*, one, within a leafy calyx.

*Spec. Char.* O.

THE *Hop* is an indigenous, perennial plant, growing in hedges, flowering in June and July, and ripening its seeds in September. Sir J. E. Smith considers the *hop* as truly wild in England, notwithstanding the old distich—

> " Turkeys, carp, hops, pickerel, and beer,
> Came into England all in one year."

This is supposed to have been in Henry VIII's reign, when, perhaps, *hops* were first used for making beer, and (as has been the case with some other

*Humulus lupulus.*

G. Sprall del.

plants) might be imported from abroad, though really wild at home. The female plants are very abundantly cultivated in the counties of Kent, Surry, Suffolk, and Essex, for the use of the brewers, who consume large quantities of the strobiles in the brewing of malt liquors.

There is but one species of the genus *Humulus;* the male and female flowers are on separate plants. The *roots* are branching, from which arise many long, twining, rough, angular, flexible *stems*, which support themselves by twining round bodies that may be placed near them. The *leaves* are opposite, in pairs, petiolate, cordate or entire, serrated, of a dark green on the upper disc, paler beneath; both the *leaves* and *petioles* are scabrous, with minute prickles, and at the base of each leaf-stalk are two interfoliaceous, entire, reflected, smooth *stipules*. The *flowers* are axillary or terminal, and furnished with *bracteas;* the males are in drooping panicles of a pale greenish-yellow colour; the *calyx* consists of five oblong, concave, minutely serrated *leaflets*. The *filaments* are five, capillary, and supporting oblong anthers, which open at the apex by two pores. The *female flowers* are in solitary, pendulous, ovate *cones* or *strobiles*, composed of membranous scales of a pale greenish colour; tubular, from being rolled in at the base, and containing the *germen*, which is small, supporting two short, subulate *styles*, tipped with awl-shaped, downy stigmas. The *seed*, which is enclosed in the tubular part of the scale, is round, flattish, truncated, and of a bay brown colour. Figure (*a*) female flower, (*b*) the germen and styles, (*c*) male flower, (*d*) back of an anther magnified, (*e*) front of an anther, shewing the pores by which they open at top.

The *hop* is not confined to Britain, but is found in many parts of Europe, and also in America. The culture of this plant was introduced into England from Flanders, about the year 1524, and the strobiles were first used for preserving malt liquor in the latter part of the reign of Henry VIII.; but the prejudice against them continued for a long period, as the citizens of London, a century afterwards, petitioned Parliament to prevent their use.*

At the season when the strobiles are sufficiently ripe, the plants are cut, a foot or two from the ground, and the poles on which they were supported, pulled up. The strobiles are then cautiously picked off, care being taken to

* The prejudices of the present times are probably as great as those in former days, for the brewers are now subject to severe penalties, who use any other bitter for preserving malt liquor, although many others are equally wholesome.

separate those that are defective from those that are sound; both kinds are carried to the kiln (for the purpose of drying) as soon as possible after they are gathered. The heat of the kiln requires to be regulated with great nicety, to prevent their being dried too rapidly. To obviate this occurrence, many kilns have two floors, on the uppermost of which the greener hops are laid, and gradually dried, before being brought to support the heat of the lower floor. Charcoal is usually employed, as the other kinds of fuel are said to injure the flavour of the hops. The strobiles are considered sufficiently dried when they become crisp; but they acquire some degree of tenacity and toughness, from lying in heaps on the floors of the store-houses, previous to their being bagged.

*Sensible and Chemical Properties.* The dried strobiles have a peculiar fragrant odour, and a very bitter, somewhat aromatic, and slightly astringent taste. New hops are of a pale, greenish-yellow hue, and appear like thin, transparent leaves; by long keeping their colour changes to a yellowish-brown. The watery infusion has a pale straw colour, is rendered muddy by the mineral acids; alkalies deepen its colour; it strikes an olive with sulphate of iron, is precipitated by solutions of nitrate of silver, tartarized antimony, superacetate of lead, and alcohol: and when rubbed with magnesia, or lime, a rod dipped in muriatic acid discovers the presence of ammonia. By distillation in water, an essential oil is obtained. The virtues of hops are extracted by alcohol, ether, and boiling water; by long boiling the aromatic properties are dissipated.

From the experiments of Dr. Ives of New York, it appears, that the active properties of hops reside in a powder, which may be readily separated from the strobiles, by merely sifting in a fine sieve. This substance forms about one-sixth part of their weight, and to it Dr. Ives has given the name of *lupulin*. According to Dr. Ives' analysis, 120 grains of lupulin contain about —of tannin 5 grains, extractive 10, bitter principle 11, wax 12, resin 36, lignin 46. The extractive matter is soluble in water only; the bitter principle is soluble in alcohol and water; the wax soluble only in the alkalies and boiling ether; the resin soluble in ether and alcohol; the aromatic and bitter properties of the lupulin are more readily and completely imbibed by alcohol than by water, and much sooner by both when hot than when cold; about five-eighths of lupulin are soluble in water, alcohol, and ether, three-eighths being vegetable fibrous matter. M. Payer, and A. Chevalier have

confirmed Dr. Ives' opinion, that the properties of the hop reside in the lupulin, or the yellow grains which are scattered over the membranous scales of the strobiles. They also discovered a volatile oil in lupulin, which is similar in odour to the hop, bnt much more penetrating. The following process has been practised by M. Planche, for purifying lupulin :—

" To separate the sand from the lupulin—put it into water, shake it for a few minutes, decant that which is held in solution by the water, and a dark-coloured sand is deposited: repeat the process several times, and spread the lupulin, which is insoluble in water, on bibulous paper; let it drain, and then dry it in the air, neither exposed to the sun, nor to a temperature above 76° Fahrenheit. It should be prepared yearly, and this cleansing process must be quickly conducted, or it will undergo a change."

*Medical Properties and Uses.* Hops are narcotic, tonic, and diuretic. We are told by Dr. Maton, that, besides allaying pain and producing sleep, the preparations of hops reduce the frequency of the pulse, and increase its firmness in a very decided manner. One drachm of the tincture, and four grains of the extract, given once in six hours, reduced the pulsations from ninety-six to sixty in twenty-four hours.* He found the extract very efficacious in allaying the pain in articular rheumatism, in which disease we have frequently administered both the tincture and extract with much benefit to our patients. As a narcotic it is very far inferior to opium; but under certain circumstances, where opium disagrees, (which is not unfrequently the case) it will generally procure undisturbed and refreshing sleep. Dr. Ives observes, " with regard to the medicinal efficacy of hops, every accurate observer must acknowledge, that they possess little merit if administered according to the directions given in our pharmacopœias. The quantity of proof-spirit which enters into the tincture would produce stimulating effects, independent of any properties which it imbibes from the hops; and, although its action may be modified by their combined agency, so as, in some measure, to increase the cordial and invigorating influence of the alcohol, it is difficult to conceive, that the tonic or narcotic virtues of the hop should be sufficiently concentrated to produce much remedial benefit. It is otherwise with the pharmaceutical preparations of the *lupulin*, which I have been accustomed to prescribe. Pretty extensive observation has confirmed my former opinion, that diseases which are the consequence of exhausted excitability,

* Observations on the *Humulus Lupulus, &c.* by A. Freake.

or, more directly, of a deranged state of the stomach and bowels, are certainly much relieved by this medicine. It frequently induces sleep, and quiets nervous irritation, without causing costiveness, or impairing, like opium, the tone of the stomach, and merely increasing primary disease. The preparation most commonly used in this city, is the tincture prepared by digesting ℥ij of the lupulin in ℥j of alcohol—dose, from ʒi to ʒij. Inquietude and watchfulness, connected with excessive irritability in all its gradations, from the restlessness consequent upon exhaustion and fatigue, to the most uncontrollable paroxysm of delirium tremens, are more frequently allayed by this remedy than any other in ordinary use. Another eligible mode of exhibiting the lupulin, is in pills. From two to four pills, each containing three grains of the powder, may be given at a dose. Dr. Desroches, who published a dissertation on the hop in 1803, supposed that its narcotic principle resided in the essential oil; but is it not more than probable that this was a conjecture, arising from the imaginary soporific virtues of the hop-pillow? It requires much experience, and accurate observation to speak confidently upon this subject; but, from having frequently used the lupulin collected from old hops, in which little aroma seemed to remain, and also the extract, prepared by decoction, by which process the essential oil is chiefly dissipated, I am still of opinion, that its narcotic properties reside in the resinous extract." Externally, an ointment compounded with the powder of the hop and lard, is recommended by Mr. Freake as an anodyne application to cancerous sores, and a decoction, used as a fomentation, affords much relief in painful tumefactions. A cataplasm, made of an infusion of the strobiles has been applied to ill-conditioned ulcers, with decided benefit.

Off. pp. Extractum Humuli. L.
Tinctura Humuli. L. E.

*Mode of employing Lupulin.* Lupulin may be administered in form of extract, tincture, pills, powder, or syrup. The *Extract* may be prepared either with the aqueous infusion, or with the decoction; when prepared with the latter, it is equally bitter, but less aromatic—dose, from five to ten grains.

*Pills of Lupulin.* Bruise the lupulin strongly,* and divide into pills of two or three grains each, of which from two to four may be taken for a dose.

* This substance becomes converted into a ductile mass, which renders it unnecessary to add any excipient.

*Piper cubeba.*

G. Spratt del.

*Powder of Lupulin.* Take of powdered lupulin one part, powdered loaf-sugar two parts. Mix—dose from ten to twenty grains.

*Tincture of Lupulin.* Take of bruised lupulin one ounce, alcohol two ounces,—digest for six days in a close vessel; strain, press strongly, filter, and add a quantity of alcohol, so as to make three ounces of tincture—dose, from thirty drops to one or two drachms.*

† Mr. Nicholas Mill affirms, that from forty to sixty minims of the saturated tincture of lupuline act as an anodyne, and have a powerful effect in allaying great nervous irritation; whilst that stupidity which often accompanies the use of opium is never induced by this medicine.

---

# ORD. XLIV. PIPERITÆ.

## PIPER CUBEBA. CUBEBS, OR JAVA PEPPER.

*SYNONYMA.* Piper caudatum. *Ger. Em.* 1540; *Bauh. Hist.* 2, 185. Cubebæ. *Raii Hist.* 1813; *Park. Theatr.* 1583; *Clus. Exot.* 184; Piper Cubeba. *Willd. Sp. Pl.* 1. *p.* 159; *Gærtn. de Fruct.* 2. *p.* 67. *t.* 92. *Vahl. En. n.* 61.

*Class* II. Diandria. *Ord.* III. Trigynia.

*Nat. Ord.* Piperitæ, *Linn.* Urticæ, *Juss.* Piperaceæ, *Kunth.*

*Gen. Char. Calyx* O. *Corolla* O. *Berry*, one-seeded, coriaceous, smooth. Joints of the stem tumid.

*Spec. Char. Leaves*, elliptico-lanceolate, smooth, five-ribbed, unequal at the base. *Spike*, solitary, on a peduncle opposite to the leaves. *Berries* on partial stalks.

THIS species of *pepper* is a native of Java, where it is called *cumac*: it grows in great luxuriance in the woods of Tuntang; it also inhabits Sierra

Leone, Batavia, Guinea, and the Isle of France. The *stems* are round, smooth, long, creeping and rooting. The *leaves* are from one to two inches in length, mostly elliptic-lanceolate, or cordate, entire, solitary at each joint of the stems, and supported on channelled *footstalks*, about half an inch in length. The *flowers* are small, and produced in crowded, solitary, terminal, *spikes*. The *fruit* is a smooth, fleshy, globular, one-celled *berry*, on a short stalk, of a deep red colour at first, but changing to brown and coriaceous when dried, containing a single roundish *seed*.* Fig. (*a*) section of the fruit; (*b*) a seed; (*c*) the embryo.

*Sensible and Chemical Properties, &c.* The berries (the officinal part of this plant) are of a grayish brown colour when dry; they have a strong aromatic odour, and a hot, spicy, pungent taste: when chewed, they heat the mouth, but leave a cool sensation on the palate. If dried with much heat previous to pulverisation, they are said to lose a considerable portion of their active properties. According to the analysis of M. Vauquelin,† *cubebs* contain a coloured resin, a thick volatile oil of a reddish colour, nearly concrete;‡ a resin analogous to that of balsam of copaiba, coloured gummy matter, extractive, analogous to that of the *Leguminosæ*, and various saline substances. The watery infusion of the powdered berries is of a reddish brown colour, cloudy, with the odour and flavour of the drug: its colour is not altered by sulphate of iron, but a precipitate falls. The powdered berries should be kept in close-stopped bottles, as it quickly loses its active properties, if exposed to the atmosphere.

*Medical Properties and Uses.* *Cubebs* are diuretic and gently aperient: by the Indian practitioners they are used as a grateful stomachic and carminative; and we are told the Arabs also use them as a condiment. *Cubebs* were introduced into this country a few years ago as a remedy for gonorrhœa, in which they were said to moderate the inflammation and discharge; and in the majority of cases cut short the disease in less time than any medicine previously made use of. Mr. Jefferies, who published an essay on this subject a few years since, considers it not only as a very safe remedy, but, in the generality of cases, infinitely more useful and expeditious than any

* The figure accompanying the above description was made from an original drawing, copied from dried specimens in the Museum of the Hon. East India Company.

† Journ. Pharm. vi. 309.

‡ Two pounds and a half have been found to afford about two ounces of oil.

which has ever yet been introduced into practice. It possesses what may be justly called a specific power in most constitutions, especially when administered in the early and acute form of the disease. It moderates the inflammation and most painful symptoms, and suppresses the quantity of the discharge in a shorter time, and with more certainty, than any other remedy with which I am acquainted.

We are told by Mr. Crawford (see Edinburgh Medical and Physical Journal for January, 1818) that "the pepper, well pounded, is exhibited in a little water, five or six times a day, in the quantity of a dessert-spoonful, or about three drachms." The ardor urinæ ceases, the discharge grows ropy, commonly in 48 hours, and frequently in less time, and the disease ceases altogether soon after. These, of course, are the most successful effects of the medicine. In some cases the cure is slower; in a few it has been said to produce swelled testicle; and in a still smaller number it has been found altogether ineffectual. The sensible effects of this remedy are extremely mild. It occasions, (though not always) a slight purging: it imparts to the urine its own peculiar odour, and promotes its quantity. Now and then it occasions a flushing of the face and a burning heat in the palms of the hands and soles of the feet. Mr. Marley says, "In cases of a recent nature, I think it may be called specific. The head and stomach are always more or less affected during the exhibition of cubebs, and there is generally a tendency to constipation."*

Dr. Trail of Liverpool states, that as far as his opinion goes, it is most useful in old and obstinate blenorrhœa, and also that it is highly beneficial in the last stage, or when the discharge is of a gleety nature. Mr. Adams,† from his experience of the efficacy of cubebs, says, they are not a specific for gonorrhœa, but that they may be considered a valuable remedy when fresh, of good quality, and finely powdered. We have been told by some respectable surgeons that they have not found it of any service whatever, that it has invariably produced some untoward symptom, which has obliged them to discontinue its use; viz. deep-seated pain in the head, distressing diarrhœa, hæmorrhoids, hæmaturia, urticaria, violent nausea, &c.‡ From our

* *Vide* Medical and Physical Journal for June, 1821.

† Edinburgh Medical and Surgical Journal, for 1820.

‡ Dr. Fosbrooke has commended cubebs in cases of inflammation of the mucous membrane of the intestines, and also in cases of chronic inflammation of the æsophagus. This is rather at variance with the opinion that it induces hæmorrhoids and hæmaturia.

own experience, we can confidently recommend cubebs as the most efficacious medicine we are acquainted with: that it will cure every case, is not to be expected, but, from numerous trials we have had, we are of opinion that more reliance may be placed on it than any other medicine that has hitherto been recommended for the cure of gonorrhœa. . Many of the untoward symptoms said to be occasioned by its use, we believe to have been caused by over-doses, too frequently repeated: we have seldom gone beyond one drachm, and usually combined it with the mucilage of acacia: we have more frequently found it open the bowels than induce constipation, as stated by Mr. Marly.

*Cubebs* are usually given in powder, either in milk, mucilage of gum-arabic, or barley-water, or administered in the form of tincture, made by macerating two ounces of powdered cubebs in one pint of proof spirit, for fourteen days. Dose—from ten drops to sixty, in any proper vehicle.

# ORD. XLVI. LILIACEÆ.

## ALOE VULGARIS. YELLOW-FLOWERED ALOE.

*SYNONYMA.* Αλόη, *Dios. lib.* iii. *cap.* 25. Aloe. *Trag. Hist.* 932; *Fuchs. Hist. v.* ii. 160; *Camer. Epit.* 430; *Matth. Valgr. v.* ii. 45-6. Aloe vulgaris. *Ger. Em.* 507; *Fl. Græc. Sibth. v.* iv. *p.* 34. *t.* 341. *Bauh. Pin.* 286. *Tourn. Inst.* 366; *Decandolle, Pl. Grasses,* 27, *cum icone; Ait. Hort. Kew. ed.* 2. *v.* ii. 292. Aloe perfoliata π, vera. *Linn. Sp. Pl.* 458. Aloe perfoliata λ, vera. *Willd. Sp. Pl. v.* ii. 186. Aloe barbadensis. *Haworth, in Trans. Linn. Soc. v.* vii. 19.

*Class* Hexandria. *Order* Monogynia.

*Nat. Ord.* Liliaceæ, Coronariæ, *Linn.* Asphodeli, *Juss.*

a

b.

Hor Britannicæ.

Printed by C. E. Muddey

*Gen. Char.* *Corolla* tubular, border spreading, six-cleft, nectariferous at the base. *Filaments* inserted into the receptacle. *Capsule* superior, oblong, three-celled. *Seeds* several, angular.

*Spec. Char.* *Leaves* sword-shaped, toothed, upright. *Stem* branched. *Flowers* yellow, in a dense panicle.

THE *stem* of this species of *aloe** is short, thick, shrubby, and branched. The *leaves* are nearly erect, or somewhat spreading, upwards of a foot in length, and about four inches broad at their base, lanceolate, acute, smooth, succulent, concave above, of a bright sea-green colour, (but when young, often spotted with white,) sessile, and crowded on the lower part of the stem.

The *flower-stem* rises about three feet in height: it is round, thick, erect, smooth, of a purplish colour, branched at top, and terminated by a loose, slender *spike* of bright yellow *flowers*. The flowers are numerous, and stand on short, smooth *foot-stalks*, each flower being accompanied by a single *bractea*. The bracteas attached to the flower-stems are triangular, membranaceous, and of a deep brownish colour. The *corolla* is monopetalous, cylindrical, oblong, and divided at the margin into six deep segments; the outer segments are larger than the inner, ovate, blunt, and spreading at the border. The *filaments* are thread-shaped, as long, or somewhat longer than the corolla, inserted into the receptacle, and furnished with oblong, incumbent *anthers*. The *germen* is oblong-ovate, angular, bearing a *style* nearly the length of the stamens, crowned with a small, simple *stigma*. Figure (*a*) represents the pistil, with the base of the corolla, (*b*) the same, with the stamens.

The whole plant abounds with a clammy, bitter, fetid, yellowish juice. This plant is a native of the Levant and Barbary; it is also very common in the West India Islands, and generally known under the name of *Barbadoes aloè*; which, probably, has arisen from its being commonly cultivated in the island of Barbadoes, for the purpose of obtaining the aloes of the shops, known by the name of *hepatic aloes*. The different methods employed for collecting the juice, and preparing the various kinds of aloes, and also their medical properties and uses, have been explicitly detailed in Vol.

* It is the αλόη of the ancient Greeks, and was found by Dr. Sibthorpe, growing spontaneously in the island of Cyprus.

IV. of this work: we have, therefore, a few observations only to make on the chemical properties of the *hepatic*, or *Barbadoes aloes:* which, as we have before observed, are the product of the *aloë vulgaris.*

*Hepatic aloes* have a peculiar strong odour, somewhat aromatic, but less so than the *Socotrine aloes.* The taste is nauseous and intensely bitter. The pieces are of a dull brown colour, glossy, and when broken, the splintered edges appear rather blunt, and of a dull yellowish hue. It becomes soft by the heat of the hand, and is adhesive; when reduced to powder, it is of a dull yellow brown. All kinds of aloes yield a small portion of vegetable mucus, resin, and a peculiar extractive matter. Braconnot* found aloes to consist chiefly of a peculiar bitter matter, which he has termed the resinous bitter principle *(âmer résineux).*† The odour, taste, and medical virtues of aloes, reside chiefly in the extractive. Boiling water dissolves nearly the whole of any of the kinds, but least of the hepatic or Barbadoes.‡ Proof-spirit takes up 86 parts in 100; the alkalies and their carbonates greatly assist in promoting the solution of aloes. By boiling aloes in water, the extractive is altered, and rendered insoluble in water, and approaches to the nature of a resin. *Socotrine aloes* yield, upon distillation, a small portion of volatile oil; but none is obtained from the *hepatic.*

* Annales de Chimie, lv. 152.

† According to the analysis of Vogel, and Bouillon la Grange, aloes contain 32 parts resin, and 68 extractive.

‡ This circumstance forms a test, which distinguishes *hepatic aloes* from the other kinds, independently of sensible properties.

*Triticum Hybernum.*

*Avena Sativa.*

*Hordeum Distichon.*

# ORD. LI. GRAMINA.

## TRITICUM HYBERNUM. WINTER, OR LAMMAS-WHEAT.

*SYNONYMA.* Siligo spicâ muticâ, *Lob. Ic.* 25; Triticum spicâ muticâ, *Ger. Em.* 65. *f.* 1; *Park. Theatr.* 1120, *f.* 1. Triticum hybernum aristis carens, *Bauh. Pin.* 21; *Mor. Hist.* 3. *t.* 11. *f.* 1. Triticum hybernum, *Linn. Sp. Pl.* 126; *Willd. v.* 1. 477; *Ehrh. Pl. Offic. n.* 151; *Ait. Hort. Kew, ed.* 2. *v.* 2. *p.* 130. Triticum vulgare, *Host. Gram. Austr. v.* 3. *p.* 18. *t.* 26.

*Class III.* Triandria. *Ord. I.* Monogynia.

*Nat. Ord.* Gramina, *Juss.* Gramineæ, *Br.*

*Gen. Char.* *Calyx*, two-valved, many-flowered; its valves opposite, transverse; the sides, (not the back,) of one of them directed to the rachis, nearly equal. *Cor.* Two-valved; its valves lanceolate; *ext.* one acuminate or awned at the extremity; *int.* bifid at the point.

*Spec. Char.* *Calyx*, four flowered, tumid, smooth, imbricated, slightly awned.

THE *root* of *Lammas*, or *Winter-Wheat*, consists of numerous downy fibres.* The *stems* are from three to four feet high, jointed and terminated by the *inflorescence*, which consists of long *spikes*, with the flowers arranged in four rows, and imbricated. The *chaff* or *calyx* is composed of two concave, oblong, keeled, smooth, nearly equal, *valves*, the outer terminated by

* This plant has two sets of roots; one set proceeding directly from the seed, and the other from the corona of the plant, about two inches above the first; the latter do not shoot till the Spring of the year, and they collect more nutriment than the seminal roots.

very short *awns*, which distinguish the *Lammas* from the *Spring wheat* (*Triticum sativum*) which has *awns* three inches long: they contain from three to four florets, three of which are usually productive. The *outer valve* of the *corolla* is concave and pointed, the *inner* one flat, blunt, and two-toothed; The *filaments* are capillary: *anthers*, linear and forked: the *germen* turbinate, bearing a short *style*, crowned with feathery *stigmas*; the *seed* or *grain* is oval or elliptical, with a narrow channel along the upper side. Fig. (*d*) the germen and calyx, magnified; (*e*) the flower expanded and magnified.

The native country of this valuable grain is entirely unknown: it has, however, been conjectured from the nature and habits of wheat, that it may have been originally a native of Asia; but it is pretty certain that Sicily was the part of Europe where it was first cultivated. It will not vegetate beyond the 62° of northern latitude, nor will it often form an ear below the elevation of 4,500 feet, or ripen at above 10,800 feet under the equator.

In England, *wheat* is chiefly cultivated in the counties of Essex, Kent, Norfolk, Suffolk, Herefordshire, Hampshire, and Berkshire. Wheat thrives best in rich clays, and heavy loams, and in favorable seasons, on good lands, the bushel of grain will weigh from 60 to 62 pounds. Several varieties of wheats are grown in this country; but the Winter or Lammas is the most productive, and hence most esteemed by agriculturists.

*Chemical Properties, &c.* Flour, or the farinaceous part of the seed, is separated from the husk or bran, after the operation of grinding, by means of sieves of various degrees of fineness. Flour, when good, is insipid, and nearly inodorous, and constitutes more than two-thirds the weight of the seed. Wheat-flour consists principally of gluten, starch, albumen, and a sweet mucilage. Its constituents may be separated by forming the flour into a paste with a little water, and washing this paste with fresh quantities of water, until it runs from it colourless. What remains, is the gluten, which, if not the same, is very analogous to, the fibrine of animal substances. From the water with which the paste is washed, a white powder (Amylum) separates on standing: the albumen and sweet mucilage may be obtained by total evaporation. It is the presence of gluten which characterises

By some botanists, *Spring* and *Winter-wheat* are considered as varieties only, not as distinct species. The latter is the most productive, and is generally cultivated on that account, for there is no material difference between the grains they produce, either chemical or medicinal—hence they are indiscriminately employed for every purpose.

wheat-flour, and on a due admixture of it with the constituents, depends the superiority of wheat-flour for making bread.

Bread is made by working the flour into a paste with warm water, a quantity of ferment, such as yeast, and a little muriate of soda to render it sapid, allowing the paste to stand until a certain degree of fermentation takes place, and then baking it in an oven, heated to about 488°. During the fermentation, a quantity of gas is formed, and as it is prevented from escaping by the toughness of the paste, and dilated by the heat of the oven, the bread is rendered light and spongy. In this process, the nature of the constituents of the flour is altered; for we are not able to obtain either gluten or starch from bread. Water, in which flour has been macerated, acquires a sweetish taste and an opaline colour, and affords precipitates with infusion of galls and the strong acids. According to Vogel, 100 parts of flour contain—gluten, 24; saccharine-gum, 5; fecula, 68; albumen, 1,50.

Starch* is a fine white powder, generally concreted in friable hexagonal columns, smooth to the feel, and emitting a peculiar sound when compressed. It has neither taste nor odour, is decomposed by heat, is not soluble in cold water or in alcohol. Warm water, at about 190° Fah. converts it into a kind of mucilage, which, on cooling, assumes a gelatinous consistence. This jelly, when dried by heat, becomes brittle and transparent like gum, but is not soluble in cold water. At 78° Fah. its watery solution ferments with the addition of yeast. By roasting, it becomes soluble in cold water, and it is converted by three or four hours boiling with sulphuric acid, into a saccharine liquid. Alcohol precipitates starch white and tough from its solutions; acetate of lead and infusion of galls also throw it down, but the precipitate formed by the latter is redissolved by heating the liquid to 120°. Both acids and alkalies combined with water, dissolve it. The strong acids decompose it, especially the sulphuric and nitric acids; the latter converting it into malic and oxalic acids. When exposed to a moderate heat, it begins to swell, and is gradually changed into a brownish substance, which is used

* Starch is found in many vegetables, combined with different substances:— 1. with gluten or fibrin, as in wheat, rye, and other similar seeds; 2. with extractive, as in beans, peas, lupins, &c.; 3. with mucilaginous matter, as in unripe corn, the potatoe, and in many other roots; 4. with saccharine matter, in beet-root, and in corn, after it has begun to germinate; 5. with an acid principle, as in the root of the *Burdock, Jatropha Manihot, Arum,* and other tuberous roots.

by the calico printers, and commonly called *British gum.* The most delicate test of the presence of starch is iodine, which renders its solution in water, even when largely diluted, of a beautiful blue colour. From the products obtained by distilling starch *per se*, it appears to be a ternary compound of oxygen, carbon, and hydrogen. According to the analysis of MM. Gay Lussac and Thenard, 100 parts of starch consist of 49,68 oxygen, 43,55 carbon, 6,77 hydrogen.

In this country, *starch* is manufactured exclusively from wheat-flour and potatoes; in the West Indies, from the Jatropha Manihot, which is the well known substance, called *arrow-root.** Starch is not absolutely identical, as obtained from different vegetables. According to M. Planche, the specific gravity of flour-starch to potatoe-starch is as 62 to 84, and this difference is not unimportant in pharmacy, as the former serves admirably to suspend camphor, and the latter is unfit. Gluten is a tough, fibrous, elastic substance of a greyish colour; it is almost tasteless, and bears a considerable resemblance, both in its properties and composition, to the peculiar animal principle, named *fibrine.* When dried, it becomes semi-transparent, and somewhat resembles glue. It is dissolved by the alkalies and acids; the latter, when strong, decomposing it at the same time.

M. Jaddei has "ascertained, that the gluten of wheat may be separated into two distinct proximate principles, which he has distinguished by the names *gliadine* and *zimome.* They are obtained by kneading newly prepared gluten, in successive portions of alcohol, until it is no longer rendered milky by the addition of water. The alcoholic solution being allowed to evaporate spontaneously, a small portion of gluten is at first deposited, and the *gliadine* remains behind, of the consistence of honey, and mixed with a little yellow resinous matter, from which it may be freed by digestion in sulphuric ether. The portion of the gluten not dissolved by the alcohol, is the *zimome.*" Gluten appears to be one of the most nutritive of vegetable substances; hence the superiority of wheat to all other grains as an article of nourishment.

*Medical Properties, &c.* Bread, as a remedial agent, is only used as an external application in the form of poultice, or as a medium to increase the bulk, and give form to very active medicines—as in pills. When toasted,

* Sago, Tapioca, Salep, and Cassava, are all varieties of starch; the former is obtained from the pith of some species of *palms,* and from *Cycas circinalis.* Salep is prepared from the bulbs of the *orchis mascula; Tapioca* and *Cassava* from the *Jatropha Manihot.*

and infused in water, it imparts a pleasant flavour to the fluid, and renders it more acceptable as a beverage in febrile diseases and dyspeptic complaints. Starch is considered demulcent; hence it forms the principal ingredient in an officinal lozenge: the mucilage prepared from it, administered in the form of enema, is used with much advantage for allaying irritation of the intestines in diarrhœa and dysentery.

Off. pp. Mucilago Amyli. L. E. D.

---

## HORDEUM DISTICHON. COMMON BARLEY.

---

*SYNONYMA.* Hordeum Distichon. *Willd. Sp. Pl. v.* i. *p.* 473. *Host. Gram. Austr. v.* iii. *t.* 36. *Proem. et Sch. Syst. Veget. v.* ii. *p.* 793.

*Class* III. Triandria. *Order* II. Digynia.

*Nat. Ord.* Gramina, *Linn.* Gramineæ, *Br.*

*Gen. Char.* *Calyx* lateral, two-valved, one-flowered, ternate, central, floret perfect, lateral ones mostly imperfect (having often, at the back of the inner valve, a bristle or abortive floret). Outer valve of the *corolla* awned. *Fruit* incorporated with the corolla.

*Spec. Char.* *Spike* distichous, awns of the hermaphrodite florets appressed, the lateral ones (male) awnless.

THE *Hordeum distichon* is an annual plant; its native country has no been satisfactorily ascertained: by some it is said to be a native of Tartary,* and also to have been found wild in Russia and Sicily. It has been long extensively cultivated in almost every country of Europe.

* Linnæus says that it is a native of Tartary, but without adducing sufficient proof.

The *stem* of this plant rises from two feet to two and a half high, terminated by the *ear* or *spike*, which is flat, with a double row of defective, or male florets, on each flat side, and a single row of fertile florets on each ridge. The valves of the calyx are linear, and one half shorter than the corolla, or inner chaff, which terminates in a straight serrated awn or beard, sixteen times its own length. When ripe, the husk is coriaceous, angular, and continues closely attached to the grain, which is ovate, oval, acute at both ends, and angular. Figure (*c*) a flower, largely magnified.

*Chemical Properties, &c.* Barley has little or no taste, and is inodorous. According to the analysis of Fourcroy and Vauquelin, it contains a large proportion of starch, an animal substance partly soluble in water, and partly forming glutinous flocculi, phosphate of lime, and magnesia; silica, iron, a small portion of unctuous, coagulable oil, and a little acetic acid.

Pearl-barley is prepared by grinding off the husk of the rough grain, by means of machinery; it is afterwards rounded in a mill, which at the same time gives the granules a polish. In this state, barley consists almost solely of amylaceous matter.

*Economical Uses, &c.* Barley cannot be considered as a medicine, nor is it ever used as such in substance. A decoction of pearl-barley, properly acidulated, is one of the best beverages in acute and febrile diseases. Barley, as an article of food, is less used than it was formerly. It is chiefly cultivated in this country for the purpose of converting into malt, for making beer, and for the distillation of ardent spirits. Pearl-barley, when boiled, forms an excellent article of nourishment.

Off. Prep. Decoctum Hordei, L. E. D.

——— Hordei Compositum, L. D.

# AVENA SATIVA. COMMON OAT.

*SYNONYMA.* Avena. *Camer. Epit.* 191; *Fuchs. Hist.* 185. Avena sativa. *Linn. Sp. Pl.* 118; *Willd. Sp. Pl. v.* i. *p.* 446. *Proem. et Sch. v.* ii. *p.* 668. *Host. Gram. Austr. v.* ii. *t.* 59.

*Class* III. Triandria. *Order* II. Digynia.

*Nat. Ord.* Gramina, *Linn.* Gramineæ, *Br.*

*Gen. Char.* *Panicle* lax. *Calyx* two-valved, two-flowered. *Corolla* of two lanceolate valves, firmly enclosing the seed, *exterior* one bearing a twisted dorsal awn. Upper florets often imperfect.

*Spec. Char.* *Panicle* equal, spikelets somewhat two-flowered. *Florets* shorter than the *calyx*, one or more of the upper ones imperfect and awnless, their base naked, root fibrous, annual.

THE *root* of this plant is annual, and consists of many fibres; the *stem* or culm rises about two feet in height, glabrous and smooth. The *leaves* broadly linear, rough, especially at the margins. The *inflorescence* is produced in a loose *panicle*, with the subdivisions on long pendulous peduncles; the two glumes of the calyx are marked with lines, pointed, unequal, and longer than the flower. There are two or three flowers in each calyx, of which one is usually imperfect; they are alternate, conical, the smaller ones awnless, the larger puts forth a strong, two-coloured bent awn, from the middle of the back. *Seeds* oblong, downy. Figure (*a*) a magnified flower, (*b*) the germen and anthers magnified.

The *Avena sativa* has been long cultivated in many countries in Europe, but it has never been satisfactorily ascertained if it be a native, or a naturalized production.* In the north of Europe many varieties of this plant are

* It was found by Commodore Anson growing wild upon the island of Juan Fernandez, on the coast of Chili.

cultivated; and in the northern parts of England, Scotland, Sweden, Siberia, and Norway, oats form the chief part of the vegetable diet of the inhabitants. In England, that which is called the potatoe oat is considered the best.

*Qualities, &c.* Oats are inodorous, taste very slightly bitter; they are chiefly composed of fecula, or starch,* combined with a portion of saccharine matter, bitter principle, and fixed oil. Vauquelin found in the ashes of oats, phosphate of lime, and silica.

*Medical Properties and Uses.* Oats can scarcely be considered as a medicine, but when freed from their cuticles, they are denominated grits, and are much used for making gruel or decoctions, which preparations are esteemed demulcent, cooling, and nutritive; hence they are much used in all inflammatory and febrile diseases. The grits, ground to gross powder, and boiled in water to a proper consistencc, form an excellent suppurative poultice.

* For the chemical properties, &c. of starch, see Triticum Hybernum.

---

# ORD. LIV. ALGÆ.

## ROCCELLA TINCTORIA. DYERS' LICHEN, ROCK-MOSS, OR ORCHAL.

---

*SYNONYMA.* Parmelia Roccella. *Achar. Meth. Lich.* 274. Lichen Roccella. *Linn. Sp. Pl.* 1622; *Dicks. Crypt. fasc.* 3. 19; *Eng. Bot. v.* 3. *t.* 211. Roccella tinctoria. *Achar. Lichenogr. Univ.* 430; *Syn. Lich. p.* 243; *Hook. Br. Fl. p.* 458. Corraloides corniculatum fasciculare tinctoreum, fuci teretis facie. *Dillen. Musc.* 120. *t.* 17. *f.* 39.

*Class.* Cryptogamia. *Ord.* Algæ.

*Nat. Ord.* Algæ. *Linn. Lichenes, Achar.*

*Roccella tinctoria.*

C Spratt del

*Gen. Char.* *Frond* between coriaceous and cartilaginous, rounded or plane, branched. *Fructifications* orbicular, adnate with the frond: *seed-bearing* portion a plano-convex disc, circumscribed by a margin of the same substance as the frond, and covering a black, compact, lentil-shaped, mass, immersed in the frond.

*Spec. Char.* *Frond* rounded, glaucous-green, branched, and nearly erect. *Fructifications* scattered, elevated, with the disc plane, glaucous, and pruinose, even with the margin which is formed by the frond.

THIS species of *Lichen* is the λειχην of Dioscorides, and the Phycos Thalassion of Pliny. It is an indigenous plant to our own country, growing on the maritime rocks of the south of England, particularly in Portland Island; but it is not found in any great abundance. It grows very plentifully in the Levant, Canary Islands, &c. from whence it is chiefly collected to supply the markets. The Canary Islands alone are said to produce two thousand six hundred quintals annually, and it is from this abundance of Orchall that the ancients gave them the name of the Purple Isles.* Mr. Macintosh of Glasgow, who is, perhaps, the largest consumer of this plant in Europe, reckons the kind brought from the Canaries as by far the most valuable; for while much of that imported from other countries is not worth £30. per ton, the best *canary-weed* (as it is called) fetches upwards of £200. per ton. From this Lichen is prepared the *Argol* or archil, so much used as a dye-stuff. The *Roccella tinctoria* is a small species of lichen, from two to four and even six inches in height, firmly fixed to the rocks by a solid base, from which rises a tuft of small, round, smooth, acutely pointed stems, more or less branched, of a whitish gray or brownish hue, and studded towards their upper part with scattered tubercles,† replete with a white powder, which some consider to be the true fructification, but the real fruit, as described by Acharius, is of a much darker colour and rarer occurrence.

* Mém. de l'Acad. des Inscriptions, iv. p. 457.

† Gertner considers them as a peculiar sort of germs or buds, which opinion has been established by Acharius. Lichens are now ranked as gemmiparous plants, propagated only by bud-knots, or gongyli.

The preparation of the *Archil* from this species of lichen was long kept a secret by the Dutch, who manufactured it into a paste, called by them lacmus or litmus; and the persons by whom it was formerly prepared, with a view to engross the manufacture, gave it the name of *tincture of turnsole*, pretending that it was extracted from the turnsole, (*Heliotropium europeum*). This substance *(Litmus)* was sold in square, hard brittle masses, about an inch in length, and half an inch in breadth and thickness. Archil is now prepared in this country, and large maufactories of it are carried on in London and Liverpool. The lichen, after being dried and cleaned, is reduced to powder in a mill; it is then mixed in a vat, with one half its weight of pearl-ash, and moistened with human urine: fermentation soon ensues, and is kept up by stirring, and by successive additions of urine, until the colour of the mass changes, first to red and then to blue. In this state it is mixed with a third of its weight of good potass, and spread out to dry.* Chalk is sometimes added to it, but with no other view than to increase its weight, but we are told that it is sometimes mixed with the lichen *fuciformis*.† It is usually sold in the form of cakes, but sometimes in that of moist pulp.

*Sensible Qualities, &c. of Archil.* Prepared Archil has a violet odour, which is said to be derived from a certain quantity of Orris-root, with which it is always more or less mixed; its taste is mawkish, with some degree of pungency. It communicates both to water and to alcohol a beautiful violet colour, which changes to red by the addition of any acid; this red colour is again destroyed, and replaced by the violet, by adding a portion of any of the alkalies. Hence, it is used in chemistry as a delicate test, to detect the presence of acid or alkaline substances. Paper which has been dyed with litmus, changes to red by acids, and has its blue colour immediately restored by an alkali: the oxygen of the air, also, in a short time, destroys stuffs dyed blue with archil. By the addition of a little solution of tin, archil gives a durable dye of a fine scarlet colour. It is least liable to change when reddened by an acid, and kept in close vessels.

* Nicholson's Journal, vol. ii. p. 311.

† This species is said to vie in richness of colouring-matter with the common Orchal, while the plant attains a much larger size: this lichen occurs very sparingly on the rocks of the south of Europe, but it is said to abound in the East Indies, especially on the shores of Sumatra.

*Fucus Vesiculosus.*

G. Spratt del.

*Medical Properties and Uses.* As a remedial agent, the Roccella tinctoria has very little, if any efficacy, although it was formerly celebrated as a specific in disorders of the lungs.* In the present day, it is chiefly used for preparing the Archil, used as a chemical test or dye-stuff, as above stated.

* Many species of *Lichen* have at different times been employed; not only in domestic economy and the arts, but in medicine; viz. *Lichen caninus,* deriving its specific name from its supposed specific effects in preventing or curing hydrophobia; *Lichen pullus,* esteemed astringent, and administered in asthma and coughs; *Lichen pyxidatus,* much used in whooping-cough and other complaints of the lungs; *Lichen saxatilis,* considered astringent and employed in hæmorrhages; *Lichen pustulatus,* which may be substituted for all-spice; also dyes a fine red; and *Lichen aphthosus,* a drastic vermifuge. Some of the above, and many other species, are also used as dye-stuffs.

---

## FUCUS VESICULOSUS. BLADDER-FUCUS. BLADDER-WRACK.

---

*SYNONYMA.* Fucus sive Alga marina latifolia vulgatissima, *Raii Syn. p.* 40. *n.* 4. Quercus Marina. *Gmel. Hist. Fuc. p.* 60. Alga sive Fucus, Quercus marina, dictus. *Baster, Op. Subs.* 2. *p.* 4, 116. *t.* 11. *f.* 2. Fucus vesiculosus. *Linn. Sp. Pl. v.* 2. *p.* 1626; *Eng. Bot. v.* 15. *t.* 1066; *Wither. Bot. Arr. v.* 4. *p.* 84; *Esper. Icon. Fuc.* 1. *p.* 33. *t.* 12; *Hook. Scot. P. II. p.* 94; *Turner, Hist. Fuc. v.* 2. *p.* 44. *t.* 88; *Hook. Br. Fl. p.* 459.

*Class* XXIV. Cryptogamia. *Ord.* III. Algæ.

*Nat. Ord.* Algæ.

*Gen. Char.* *Seeds* mixed with jointed fibres, produced in clustered *tubercles,* which burst at their summits.

*Spec. Char.* *Frond* coriaceous, flat, linear, dichotomous, entire, with a central rib; vesicles innate, in pairs; receptacles, distinct, terminal, turgid, mostly elliptical.

THE *root* of this plant is black and woody, forming an expanded callous disc; the *frond* is smooth, glossy, flat, linear, winged, from one to four or five feet long, and from half an inch to two inches wide, forked near the root, and afterwards repeatedly dichotomous, of a dark olive-green colour, becoming paler near the apices, and, when dry, black and dull. All the branches are nearly of an equal height, with the apices rounded, often notched, with the margin entire. The *substance* of the frond is coriaceous, tough and flexible; (when dried brittle) and furnished with a midrib. In the membraneous part of the frond, throughout its whole length, are found immersed spherical *vesicles*, varying in size from that of a small pea to a hazel-nut, externally smooth, and containing in their cavity a quantity of air. The *fructification* consists of compressed, turgid *receptacles*, solitary or twin, placed at the end of the branches, varying in form, but mostly elliptical, from one-fourth of an inch to two inches long, and perforated with very minute pores, under which lie embedded spherical *tubercles*, composed of short jointed fibres, mixed with seeds of an elliptical form, surrounded with a pellucid limbus, and appearing under a powerful microscope to contain six or seven roundish grains; the receptacle is filled with a tasteless and colourless mucus, through which passes anastomosing fibres. Its fructification is produced in spring. Fig. (*a*) part of a receptacle magnified; (*b*) horizontal section of a receptacle; (*c*) longitudinal section of a vesicle; (*d*) seeds; (*e*) tubercle.

The Fucus vesiculosus* is a perennial plant, growing abundantly on rocks and stones, or cast up on the beach every where on the British shores, and well-known by the popular name of sea-weed. In Scotland the name Wrack is applied to this and other species of Fuci which are gathered on the shores, for the manufacture of kelp.† When the plant is dried in the usual manner, it becomes brittle and of a dull blackish colour; and is often

* The ancients were unacquainted with this plant, which was first described by Clusius, under the name of Quercus *marina.*—*Hist.* i. 21.

† Kelp is a very impure carbonate of soda, containing muriate and sulphate of soda, charcoal, and other impurities; and is manufactured chiefly in Scotland, in the months of July and August. It is obtained by burning sea-weed in a kiln, until it becomes a compact mass, which, when cool is broken to pieces, and packed for use. Several kinds of sea-weed are used for this purpose, but chiefly the *Fucus vesiculosus, serratus,* and *nodosus.*

covered with a saline efflorescence: but if the fresh plant be immersed in boiling water before drying it, the colour remains as vivid as in the fresh plant.

*Qualities.* Its taste is nauseous and somewhat like that of soda; its odour peculiar but slight. When fused, it yields charcoal, soda, and iodine.

*Medical Properties and Uses.* The burnt plant is considered deobstruent; and has been exhibited in diseases of the glands (particularly goître and scrofula) with much success. Dr. Russell found the mucus in the vesicles of the plant to be an excellent resolvent when externally applied, in dispersing scrofulous swellings. He recommends the patient to rub the tumour with these vesicles bruised in the hand, and afterwards to wash the part with sea-water. It appears that the beneficial effects produced by the external exhibition of this plant, may be chiefly attributed to the iodine it contains.

*Iodine* is a simple body, discovered by M. Curtois in the mother-waters formed in the preparation of soda from sea-weed.* These waters are obtained by burning the different fuci which grow on the sea-shores, lixiviating the ashes and concentrating the liquor. The name iodine is derived from the Greek word ἰωδης, on account of the blue colour of its vapour. At the ordinary temperature, iodine is a solid substance, in the form of small greyish crystals, which have but a weak tenacity, and the aspect of plumbago. It fuses at 170° c. (338 Fah.) and volatilizes at 175° (347° Fah.) forming a very beautiful violet-coloured vapour. This vapour, when enclosed in a receiver, re-condenses into crystalline scales. It has a pungent odour, an acrid taste, and stains the skin of a brownish-yellow colour. It is soluble in alcohol and ether (the latter taking up more or less, according to its degree of rectification) but sparingly so in water: its solutions have an orange-brown tint, destroying the vegetable colours. Iodine forms, with oxygen, the *iodic acid*, and with chlorine the *chloriodic acid*. It has much affinity for hydrogen, and takes it from a great number of bodies. It absorbs it in a gaseous state when the temperature is elevated; and forms with this gas the hydriodic acid, which is composed exclusively of iodine and hydrogen.

* Iodine has ben obtained from a great variety of marine plants; as the *Fucus saccharinus, serratus, vesiculosus, Filum, nodosus, palmatus, digitatus; Ulva umbilicalis, Paronia, &c.* It has also been procured from sponge, by Dr. Fyfe, and M. Straub of Hofwyl.

This acid presents itself under the form of a colourless gas, which has a very strong taste, a very penetrating odour, powerfully reddens the tincture of turnsol, and extinguishes burning bodies. This gas is very rapidly absorbed by water, and is very largely dissolved in it. It gives out white fumes in the air by uniting with the aqueous vapour contained in the atmosphere.

Starch is the most delicate test of iodine, forming a compound of a rich blue colour, when added to any solution which contains it in an uncombined state. The specific gravity of iodine is 4,941, and that of its vapour 8,678 ; 100 cubic inches weighing about 270 grains.

*Preparations of Iodine.* Wollaston was the first who gave a precise formula for preparing it; he dissolved the soluble part of kelp in water, and after evaporating it as long as it continued to afford crystals, he added a little more sulphuric acid to the remaining liquid than was necessary to neutralize the free soda which it contained, and after all action had ceased, he added as much black oxide of manganese to the clear liquor which remained, and on the application of heat, iodine was disengaged. Dr. Ure recommends the following formula to be adopted. "Take eight fluid ounces of the brown liquid which drains from the salt which the soapmakers use, who employ kelp, boil up and evaporate to dryness; heat it to 230° Fah. and add one fluid ounce of sulphuric acid diluted with its own bulk of water. When the mixture cools, separate the crystals of the salts which will form in it, by filtration through a woollen cloth, and add to the fluid poured into a matrass, 830 grains of black oxide of manganese in powder. A glass globe is then to be inverted over the mouth of the matrass, and the heat of a charcoal-chaffern being applied, iodine will sublime in great abundance.

"It must be washed out of the globe with alcohol, then drained and dried on plates of glass, and purified by a second sublimation from dry quick-lime."

*Medical Properties and Uses of Iodine.* M. Coindet, a physician of Geneva, was the first who used iodine in medicine ; suspecting, from analogy, that this substance was the active principle in sponge, he was induced to try it in those cases for which burnt sponge was administered, and his treatment of goître was remarkably successful. These trials were repeated by several practitioners in France, Italy, and in our own country, with undiminished benefit; and their observations would seem to prove that we now possess a powerful remedy for the removal of a disease which has been

hitherto cured with great difficulty. Several instances are recorded, in which hard, old, and very large goîtres, have yielded to this remedy: nevertheless, success is most commonly to be expected in recent cases, and in individuals who have not arrived at maturity. Iodine has been also employed for the cure of scrofula, and with seemingly equally beneficial results. M. Coindet recommends it as a powerful emmenagogue; it has also been recommended in laryngeal phthisis, leucorrhœa,* syphilitic enlargements, tabes mesenterica, chronic dysentery,† scrophulous opthalmia, hæmoptōe supervening to suppressed menstruation, and to hasten the cicatrization of venereal ulcers,‡ &c. The late Mr. Haden reports a case of phthisis supposed to have been cured by iodine.

*Preparations, and Mode of prescribing Iodine:—*

TINCTURE OF IODINE.

Take of, Alcohol at 35° . . . 1 ounce (7 dr. 52. 5 gr. troy)
Iodine . . . . . 48 grains (gr. 39. 36 troy) Mix.‖

Dose ten drops, three times a day, in a wine-glass full of sugared water, and gradually increased to twenty drops. Four cases of Bronchocele are said by Mr. Rickwood to have been cured or relieved by the tincture of iodine administered as above,§ and Mr. Calloway of the Borough has employed it with great success, in several cases of scrophulous enlargement of the glands, not only of the surface, but of the mesentary.

SOLUTION OF HYDRIODATE OF POTASS.

Take of Hydriodate of Potass . 36 grains (gr. 29. 52 troy)
Distilled water . . . 1 ounce (7 dr. 52. 5gr. troy) Mix.

This solution may be given in the same manner as the tincture, and for the same disorders. Dr. Gairdner, however, prefers this preparation to the tincture. He usually begins with ten drops, and gradually augments the dose to twenty, and rarely to twenty-five. By the use of this solution a soft bronchocele will be discussed in a month or six weeks; but those which are hard and of long standing, require a longer period. We are told by Dr. Wagner, that he has employed with considerable success, an ointment composed of 18 grains of the hydriodate of potass to six drachms of lard, in tu-

* M. Gimele. † Professor Brera. ‡ Dr. Costor of Paris.
‖ Twenty drops contain about one grain of iodine.
§ London Medical and Physical Journal, August, 1823.

mours of the bronchocele kind, and in a cancerous tumour of the maxillary region.

OINTMENT OF HYDRIODATE OF POTASS.

Take of Hydriodate of potass . . . ½ gros.*
Hog's lard . . . . . 1½ ounce. Mix.

A small piece, (about half a drachm) of this ointment may be rubbed, morning and evening, upon enlarged glands, and the quantity may be gradually increased, according to the age of the individual, and circumstances of the tumour. In very obstinate cases, it is necessary to give some preparations of iodine internally, during the external application, the treatment by friction alone not being sufficient. It must not, however, be concealed, that very untoward effects have not unfrequently accompanied or followed the injudicious use of this powerful medicine. We are told by Dr. Gairdner,† that the symptoms usually produced, are, a peculiar, great, and persevering anxiety and depression of spirits, which are very different from hypochondriasis, inasmuch as they dwell principally on the present, and have no reference to the future. The emaciation and cholera produced by it, are also stated as frequently extending to a dangerous, and even fatal result. When the patient is under the full influence of iodine, Dr. Gairdner has found a degree of tremor to come on, which he considers as a good guage of the extent of the nervous excitement which has taken place, and is seldom or never absent, when that excitement has proceeded to any considerable degree. In the cholera induced by iodine, Dr. Gairdner has observed sedatives, such as *hyoscyamus*, *opium*, *&c.* to be more beneficial than any other class of medicines; purgatives are said invariably to do harm. Iodine frequently stimulates the arterial system so much that it is necessary to discontinue its use; and if it be administered in doses too large, or too often repeated, it is apt to produce inflammation of the stomach, attended by nausea, &c. We are told that it not unfrequently causes a remarkable wasting of the testes and mammæ.

* The gros is 59 grains.

† Essay on the Effects of Iodine, &c. by W. Gairdner, M.D. 1824.

*Boswellia serrata.*

G. Spratt del

# ORD. TEREBINTHACEÆ.

## BOSWELLIA SERRATA. SERRATED BOSWELLIA, OR GUM-OLIBANUM TREE.

*SYNONYMA.* Boswellia serrata. *Colebrooke in Asiat. Res. v.* ix. *p.* 377.

*Class* X. Decandria. *Order* I. Monogynia.

*Nat. Ord.* Terebinthaceæ. *Trib.* IV. Burseraceæ, *Decand.*

*Gen. Char.* *Calyx* inferior, five-toothed. *Corolla* of five petals. *Nectary* a crenulated fleshy cup, surrounding the lower part of the germen, with stamens inserted on the outside. *Capsule* three-sided, three-valved, three-celled. *Seeds* solitary, membranous, winged.

*Spec. Char.* *Leaves* pinnate. *Leaflets* obtusely serrated, villous. *Racemes* simple, axillary. *Petals* ovate. *Filaments* inserted on the exterior margin of the *nectary*. "*Stack. extr. bruc. p.* 19. *t.* iii." *Decand. Prodr. v.* ii. *p.* 76.

THE *Boswellia serrata* is a native of the mountainous parts of India, inhabiting the forests between the Sōne and Nāgpūr.* It is a large *tree*, with its foliage crowded at the extremities of the *branches;* the *leaves* are impari-pinnate, consisting of ten pairs of sessile *leaflets*, each about an inch, or an inch and a half in length, obliquely-ovate, oblong, obtuse, serrated, villous, and supported upon short, downy *petioles:* the *flowers*, which are numerous, are produced in axillary *racemes*, shorter than the leaves, and accompanied

* Asiatic Researches, Vol. ix.

by minute *bracteas;* the *calyx* is monophyllous, five-toothed,* and downy; the *corolla* composed of five oblong, spreading *petals*, of a pale pinkish colour, externally downy; the *nectary* is a fleshy, crenulate, coloured cup, adhering to the calyx; the ten *stamens* are alternately shorter, and support oblong *anthers;* the *pistillum* consists of an ovate *germen*, cylindrical *style*, and trilobate *stigma;* the *capsule* is smooth, three-sided, three-valved, three-celled, each cell containing one perfect *seed* only, which is broad, cordate, and winged. Figure (*a*) the capsule, (*b*) transverse section of the same, (*c*) a seed magnified.

The gum which exudes from this tree was noticed by Mr. D. Turnbull, (surgeon to the Residency at Nāgpūr) who accompanied Mr. Colebrooke (on his journey to Barar, in the year 1798); the former gentleman judged it to be *olibanum*, and so did several intelligent natives; "but," says Mr. Colebrooke, "the notion prevalent among botanists, that *olibanum* is the produce of a species of juniper, left room for doubt."† I now learn from Mr. Turnbull, that, since his return to his station at Mirzāpūr, he has procured considerable quantities of the gum of this tree, which he has sent to Europe at different times; first, without assigning the name of *olibanum*, and more lately, under that designation. It was in England recognized for *olibanum*, though offered for sale as a different gum; and annual consignments of it have been since regularly vended at the East India Company's sales.‡ The *olibanum* of commerce is chiefly imported into Europe from India, but is also brought from the Levant in casks and chests. It distils from incisions made in the bark of the tree during the Summer months.

*Sensible and Chemical Properties, &c.* *Olibanum* is a transparent, brittle

* "The fructification is remarkably diversified on the same plant. I have found, even on the same raceme, flowers, in which the teeth or lobes of the calyx varied from four to ten; the number was generally five, sometimes six, rarely seven, more rarely four, and very rarely ten; petals as many as divisions of the calyx; stamens twice as many; capsule generally three-sided, sometimes four, rarely five-sided, with as many cells and as many valves; seeds generally solitary: the dissection of the germen does indeed exhibit a few in each cell, but only one is usually matured."—*Vide Dr. Roxburgh's Description, Asiatic Researches, Vol.* ix. *p.* 380.

† Asiatic Researches, Vol. ix. *p.* 381.

‡ Formerly, this gum was supposed to be the produce of a species of juniper, (*Juniperis Lycia*, vide Vol. i. *p.* 16. of this work) but Mr. Colebrooke has satisfactorily proved that the tree we have described produces the *olibanum* which comes from India.

substance, of a pale yellow or reddish colour; it consists of grains of various sizes, from that of a pea to a chesnut, and is generally covered with a whitish powder, próduced by the friction of the grains against each other. It has a bitterish and somewhat pungent taste, and when chewed, sticks to the teeth, and renders the saliva milky. It is not fusible, but inflammable, burns brilliantly, with an agreeable odour, and leaves a whitish ash, composed of sulphate, carbonate and phosphate of lime, with muriate and carbonate of potass. *Olibanum* forms a milky solution, when triturated with water, and a transparent fluid with alcohol. When distilled alone, it affords a small portion of volatile oil; but distilled either with water or spirit, no oil comes over. Ether dissolves nearly three-fourths, and when evaporated on water, leaves a very pure transparent resin, while the part undissolved becomes white and opaque, and the greater part of it is soluble in water, forming a milky solution. Neumann got from 480 grains, 346 alcoholic, and 125 watery extract; and inversely, 200 watery, and 273 alcoholic. According to the analysis of Braconnot, 100 parts of olibanum contain 8 parts of a fragrant volatile oil, (which resembles that of lemons both in odour and colour) 56 resin, 30 gum, and 5,2 of a matter resembling gum, but insoluble in water or alcohol.

*The Medical Properties and Uses* of *Gum Olibanum* have already been detailed under the article *Juniperis Lycia;* it is, however, now seldom employed, but as a perfume to fumigate the apartments of the sick.

# ORD. RUTACEÆ.

## BONPLANDIA* TRIFOLIATA. THREE-LEAVED BONPLANDIA.

*SYNONYMA.* Bonplandia trifoliata. *Willd. Act. Berol. An.* 1802. *p.* 24. *Humb. et Bonpl. Pl. Æquin. v.* ii. *p.* 57. *t.* 96. Bonplandia angostura. *Rich. Mem. de l'Instit. An.* 1811. *p.* 82. *t.* x. *Spreng. Syst. Veget. v.* i. *p.* 780. Bonplandia à trois feuilles. *Rocq. Phytogr. Medic. v.* ii. *t.* 143. Galipea officinalis. *Hancock, in Trans. Med. Bot. Soc. v.* i. *t.* 2. Galipea cusparia. *St. Hil. Decand. Prodr. v.* i. *p.* 731. Cusparia febrifuga. *Humb. Tabl. Géogr. des Plantes.* Angostura cuspare. *Proem. et Sch. Syst. Veget. v.* iv. *p.* 183.

*Class* V. Pentandria. *Order* I. Monogynia.

*Nat. Ord.* Rutaceæ, *Div. II.* Cusparieæ, *Decand.*

*Gen. Char.* *Calyx* five-partite. *Petals* five, somewhat cohering at the base. *Nectaries* ten, squamiform. Some of the *stamens* sterile. *Anthers* spurred. *Capsule* five-valved, one-seeded. *Spr.*

*Spec. Char.* *Leaflets* ovato-lanceolate, entire, glabrous, dotted with glands. *Flowers* panicled, bearded. *Spr.*

THIS elegant evergreen *tree* rises to the height of from sixty to eighty

* Of Willdenow, not Cavanille's. Botanists are not yet agreed as to the genus in which the present plant should be placed, as may be seen by the subjoined synonyms; but St. Hilaire is decidedly of opinion, that both *Bonplandia (Willd.)* and *Cusparia* of *Humboldt*, should be united to *Galipea*.

*Bonplandia trifoliata*

G. Sowerby del.

feet.‡ The *trunk* is cylindrical, branching towards the top; the *branches* numerous, alternate, and the upper ones spread nearly horizontally; both trunk and branches are covered with a grey-coloured *bark*. The *leaves* arise alternately on the branches, are about two feet long, independent of the *petiole*, and composed of three oblong, ovate *leaflets*, pointed at each extremity, and attached to a common petiole, from ten to twelve inches in length, and channelled. The *flowers* are produced in terminal *racemes*, composed of alternate *peduncles*, bearing from three to six flowers each. The *calyx* is inferior, persistent, five-toothed, and tomentose; the *corolla* funnel-shaped, composed of five *petals*, so united below, as to appear to form one tube, with a five-cleft, spreading border; the *nectary* consists of five glandular bodies, covering the base of the germen; the *stamens* are shorter than the petals; the *filaments* are white, and support yellow *anthers;* the *pistil* is formed of five oval, hairy *germens*, with a single *style*, supporting five, fleshy, green *stigmas*. The *fruit* consists of oval, bivalved *capsules*, each containing a single *seed*.† Figure (*a*) represents the corolla spread open, (*c*) the style and stigma, (*d*) an anther, (*e*) the calyx and bractea, (*g*) the germen and style, (*f*) the germens further advanced to maturity, (*h*) a capsule, (*i*) a capsule open, (*j*) the elastic arillus, from a dried specimen, collected by Dr. Hancock.

The *Bonplandia trifoliata* is a native of South America, growing abundantly in the woods, near the eastern bank of the Carony, at the foot of the hills that surround the Missions of Capassui, Alta Græcia, and Upata; it also grows west of Cumana, in the Gulph of Santa Fé, and Neuva Barcellona. The bark of this tree has been long known in commerce, under the names of *cusparia* and *angustura;* the latter of which is derived from Angostura, and the former, probably, from Capassui, where it is collected.

* Dr. Hancock, who traversed repeatedly, and resided during several months, in the Missions of Carony, where he had an opportunity of seeing many thousands of the trees which produce the *Angustura bark*, says, "that it seldom or never exceeds the altitude of twenty feet; the usual medium being about twelve or fifteen feet. The diameter of the trunk, which is tolerably erect, is from three to five inches. The parts of fructification also differ very materially from Humboldt's description."—*Vide Transactions of the Medico-Botanical Society of London, Vol.* i. *part* i. *p.* 17.

† We are told by Dr. Hancock, that the seeds are enclosed in an "uncommonly strong and horny arillus." This appendage is so elastic, that it is difficult to preserve the seeds, the capsule always bursting in the dried specimens.—*Transactions of the Medico-Botanical Society of London, Vol.* i. *part* i. *p.* 25.

*Cusparia*, or *Angustura bark*, was formerly supposed to be the product of a tree growing in Africa, or the Spanish West Indies, and the first parcels of bark were imported from St. Domingo; but the recent travels and discoveries of Baron Humboldt and Bonpland* have led to the knowledge of the true place of its growth.

*Sensible and Chemical Properties, &c.* Genuine *Angustura bark*,† as it comes to market, has a bitter, and somewhat aromatic taste, which is rather permanent, and when chewed, leaves a sense of heat and pungency in the mouth and throat: its odour is peculiar, but not very powerful. Externally, the pieces are covered with a greyish, wrinkled epidermis; internally, their surface is smooth, and of a yellowish brown colour: it breaks with a close, short, resinous fracture, and is easily pulverized. The bark, when powdered, and triturated with lime or calcined magnesia, emits a smell of ammonia. It yields its active properties both to hot and cold water; the watery infusion precipitates infusion of galls and yellow cinchona, and is precipitated by sulphate of iron, tartarized antimony, sulphate of copper, acetate of lead, oxymuriate of mercury, and pure potass; but it does not precipitate gelatin. Sulphuric acid gives the infusion a brown colour, and gradually a lemon-coloured precipitate is deposited; nitric acid deepens the colour of the infusion to a blood-red, and, after some time, produces a lemon-yellow precipitate: the muriatic acid does not affect it. Sulphuric ether takes up one part from ten of the powder, and when evaporated on water, leaves a greenish-yellow, acid resin, and renders the water milky. The alcoholic tincture reddens litmus paper, and becomes milky on the addition of water. By distillation with water, the bark yields a small portion of a white essential oil; hence we may conclude that *Angustura bark* contains *resin*, a peculiar variety of *extractive*, *carbonate of ammonia*, and *essential oil*. A species of *Angustura bark*, in some respects resembling the genuine bark, has lately been introduced on the Continent. The plant which affords it has not yet been ascertained; at one time it was supposed to be the produce of the *Brucea ferruginea*, a common tree in Abyssinia: this, however is not the fact, as, instead of coming from the neighbourhood of the Red Sea, it is brought

* The generic name given to this tree was imposed by Willdenow in honour of Bonpland, and since adopted by Humboldt; but again, by the latter, changed to *Cusparia*.

† The London College, in their Materia Medica, retain the name given to this tree by Humboldt, viz. ***Cusparia febrifuga.***

from South America. Planche, who chemically examined it, named it *Angustura ferruginea.* This bark is possessed of very deleterious properties; when chewed, it excites a highly acrid sensation, and leaves an extremely nauseous bitter taste in the mouth and throat. From experiments made by Orfila (Vide Toxicology, vol. ii.) on animals, it appears to be one of the most energetic of the vegetable poisons. The deleterious property of this bark is said to reside in a peculiar alkali (called *Brucine).* This bark may be distinguished from the genuine *Angustura bark,* by its greater thickness and weight, and by the epidermis being warty and of a brownish olive colour. By macerating the powder in diluted muriatic acid, it becomes of a very beautiful green, owing to the iron contained in the cuticle of the bark.

*Medical Properties and Uses.* Genuine *Angustura bark* is a valuable tonic and stimulant. It was originally introduced as a febrifuge in intermittents, and was supposed to be superior to the Peruvian barks; but subsequent experience has proved it greatly inferior to the latter for the cure of intermittents, in this country at least: it is, nevertheless, a medicine possessed of very considerable powers, and may be exhibited in most diseases where a general tonic is indicated. We are told by Dr. Hancock, that, "in the years 1816 and 1817, there prevailed, in the district of the Orinoko, and particularly at St. Thomas de Angustura, a malignant bilious intermittent fever, which proved fatal to great numbers of the inhabitants, as well as to foreigners. In the latter, it assumed the form in many cases, of the true yellow fever, with *vomito prieto.* In March 1817, the mortality increasing, our stock of *cinchona* was expended, and we had no other resort but to the *Quina de Carony (Angustura bark)* of which there was a large supply in the town. It was prepared nearly as prescribed by those who were then termed *Curiosos,* or the native doctors.

"Into a large jug, containing about six gallons, we put one pound of coarsely-powdered bark, with an equal quantity of brown sugar, filled it nearly with boiling water, and added about four ounces of wheaten bread to hasten fermentation. It was then stopped close, placed in the sun, and shaken frequently. As soon as fermentation began, it was considered fit for use, and administered in the quantity of from four to six ounces in a dose, three or four times a day."

In the month preceding the adoption of the *cortex Angusturæ,* fifty-three persons died of fever; the month following, there were but fourteen, and

several of these were in a dying state when they began to use the bark. The Doctor further observes—"I am fully convinced, from ample experience of the virtues of this bark, that it is one of the most valuable febrifuges we possess, being adapted to the worst and most malignant bilious fevers; while the fevers in which cinchona is chiefly administered are simple intermittents, for the most part unattended with danger."

*Angustura bark* is also a valuable tonic, in debilities of the stomach and intestinal canal, in chronic diarrhœa, dysentery and dropsy. It is best exhibited in powder or infusion; of the former, the dose may be from twenty to sixty grains three or four times in the twenty-four hours: when given, however, in large doses, it is apt to produce nausea, in whatever form it may be exhibited.

Off. The Bark.

Off. Pp. Infusum Cuspariæ, L.
Tinctura Cuspariæ, E. D.

---

# ORD. DIPTEROCARPEÆ.

## DRYOBALANOPS CAMPHORA. CAMPHOR DRYOBALANOPS, OR CAMPHOR TREE.

---

*SYNONYMUS.* Dryobalanops Camphora. *Colebr. in Asiat. Res. v.* xii. *p.* 539; *Malay. Miscel.* i. *p.* 5.

*Class* XIII. Polyandria. *Ord.* Monogynia.

*Nat. Ord.* Dipterocarpeæ,* *Blume.*

* This Order has been established by Blume, and includes *Dipterocarpus* of Gertner as well as *Dryobalanops;* if indeed this latter genus be really distinct. The individuals which compose it are described as graceful trees, inhabiting the Indian Archipelago, and

*Dryobalanops camphora.*

G. Sorau del

*Gen. Char.* *Calyx* of one leaf, permanent, the border divided into five long, ligulate, reflexed wings. *Corolla* five-petaled. *Capsule* superior, one-celled, three-valved. *Seed* solitary. *Embryo*, inverse, without perisperm.

*Spec. Char.* *Leaves* superior, alternate, inferior ones opposite, elliptical, obtusely acuminate, entire. *Petioles* short. *Stipules* in pairs, subulate, caducous.

The *Dryobalanops Camphora* is a native of Sumatra and Borneo.* We are told by Mr. Prince† that it is to be found in great abundance in the forests, from the back of *Ayer Bongey*, as far north as Bacougan, a distance of two hundred and fifty miles. It is classed among the tallest and largest *trees* that grow on the coast, frequently measuring from six to seven feet in diameter, but they are many years of age before they acquire that size. The following description we have from Mr. H. T. Colebroke's scientific paper on this subject in vol. xii. of the Asiatic Researches. He says: "The description I shall offer of it is unavoidably imperfect, as the flower has not yet been seen by any botanist." The *trunk* rises to a great height, is arboreous, and covered with a brownish *bark;* the *leaves* are from three to seven inches long, and from one to two broad, elliptical, obtusely acuminate, entire, parallel-veined, smooth, and standing upon short *petioles*, with subulate caducous *stipules*, in pairs; the lower *leaves* are opposite, the upper ones alternate; the *perianth* is persistent, one-leaved, divided at the border into five foliaceous, spathulate, rigid, reflexed *wings;* the *capsule* is superior, ovate, woody, fibrous, finely streaked with longitudinal furrows, embraced at the base by the calycine, hemispherical cup of the *perianth*, and surrounded by its enlarged *leaflets;* one-celled and three-valved; the *seed* is solitary, conforming to the cavity of the capsule, and has a strong terebintha-

abounding in resinous juice. The *leaves*, in all, one-petioled, alternate, entire, veined in a pinnated manner, jointed upon the stem with an involuted æstivation. Oblong *stipules* are present, which are circumvolute about the young leaf, as in the fig-tribe, and deciduous, leaving a circular scar, which indicates their pre-existence. *Peduncles* racemose and axillary near the extremity of the branches, or rarely constituting a terminal panicle.—*Blume, Flora Jervæ.*

* This tree is not known to exist in any other part of the world.

† Asiatic Researches, Vol. xii.

ceous fragrance.* Figure (*a*) the perianth and capsule, (*b*) transverse section of the capsule, (*c*) horizontal section of the same, (*d*) the embryo magnified.

It has been supposed that the greater part of the camphor of commerce is the product of the *Laurus camphora*.† Kœmpfer, indeed, had long ago remarked, that the camphor which is found in a concrete state, and which occupies large portions in the trunk of a tree, growing in the islands of Borneo and Sumatra, is not produced by the *Laurus camphora;* but we are indebted to Mr. H. T. Colebroke for the discovery of the species which yields it.

The camphor yielded by the *Dryobalanops camphora*, is found occupying portions of about a foot, or a foot and a half, in the heart of the tree. The natives, in searching for the camphor, make a deep incision in the trunk, about fourteen or eighteen feet from the ground, with a billing or Malay axe; and when it is discovered, the tree is felled, and cut into junks of a fathom long. The same trees yield a liquid, or oily matter, which has nearly the same properties as the camphor, and is supposed to be the first stage of its formation. The precise age when this tree begins to yield camphor, has not yet been satisfactorily ascertained, but the young trees are known to yield only oil. The method of extracting the oil, is by making a deep incision, with a small aperture, into the heart of the tree, and the oil (if any) immediately gushes out, and is received in bamboos, &c. The product of a middling-sized tree is about eight China catties, or about eleven pounds, and a large tree will yield nearly double that quantity. It is said that trees which have been cut (for the purpose of extracting the oil) and left standing in that state, will often produce camphor in eight or ten years after;‡ but it is of an inferior quality.

* Specimens of the flowers were sent by Mr. Prince to Sir Stamford Raffles in 1819, from which a description was drawn up and published by Mr. W. Jack, in No. I. of the Malayan Miscellanies. According to Mr. Jack, the *flowers* are terminal and axillary, forming a kind of panicle at the extremity of the *branches;* the *calyx* is monophyllous, with five linear-lanceolate, spreading segments; the *corolla* is five-petaled, longer than the calyx; the *petals* ovate-lanceolate; the *stamens* are numerous, and have their *filaments* united into a ring; in which particular it differs from the genera most nearly allied to it; the *anthers* are nearly sessile on the tube of the filaments, conniving into a conical head round the *style*, and terminating in membranous points; the *germen* is superior, ovate, with a slender, filiform style, longer than the stamens, and crowned by a capitate stigma.

† Vide vol. IV. p. 681, of this work.

‡ Asiatic Researches, vol. xii.

The camphor which is the produce of this tree, is little known in Europe: the greater part is said to be carried to China, where it fetches a very high price. Camphor is imported into this country in casks and chests, chiefly from Japan, and comes in small granular, or friable masses, which are afterwards purified by sublimation.

*Chemical Properties, &c. of Camphor.* Pure *Camphor* has a strong, peculiar, fragrant and penetrating odour, and a bitter, aromatic, pungent taste, accompanied with a sense of coolness; it is white, pellucid, unctuous to the touch, and friable; breaking with a shining, foliated fracture, which displays a crystalline texture; notwithstanding its friability, it is extremely difficult to be pulverised, requiring, for this purpose, to be slightly moistened with alcohol. It is not altered by exposure to the atmosphere, but if it be not kept in well stopped vessels, especially during warm weather, it evaporates completely. It is lighter than water, (sp. gr. 0,9887) and nearly insoluble in that fluid, but communicates to it a certain portion of its odour.* It melts at a temperature of 88°, (Fah.) boils at 400°, and sublimes in close vessels, crystallizing unchanged in hexagonal plates; or, according to Mr. W. Philips, into flat octohedrons. It readily ignites, burning with a brilliant flame, and giving out much smoke. Alcohol, ether, the sulphuric and nitric acids, a little diluted, and the muriatic, strong acetic, and fluoric acids, dissolve camphor, as also the fixed and volatile oils: it is separated unchanged from these solutions, by the addition of water. It is decomposed by the concentrated sulphuric acid, forming artificial tannin; and by repeated distillation with nitric acid, it is converted into camphoric acid. It unites with the hardest resinous substances, converting them into soft, tenacious masses. The alkalies have but little action on camphor; when mixed with clay, and distilled in close vessels, it is decomposed into a volatile oil and charcoal;† from this, it would appear to differ from the essential oils, only in containing a larger proportion of carbon. Dr. Thomson gives its component parts as follows:—carbon 6,875; hydrogen 1,250; oxygen 1,000.

Camphor was for some time supposed to be a resin, and was so designated by the Dublin College; but chemists have now agreed that it is a vegetabl

* According to Cadet, one French pint of water dissolves about 16 grs. of camphor, which are again precipitated by pure potass.—*Ann. de Chimie*, lxii. 132.

† According to Bouillon la Grange, 45,856 of volatile oil, and 30,571 of charcoal.

principle, *sui generis;* and the researches of modern chemists have ascertained that it is a principle found in many trees and shrubs, besides those from which the camphor of commerce is obtained: viz. from the roots of *galangale*, *zedoary*, *ginger*, and the *cinnamon*, *cassia*, and *sassafras laurels;* and from many of the *verticillate* tube of plants, as *sage*, *rosemary*, *lavender*, *hyssop*, *&c.*

Zea describes a variety of camphor, procured from a tree in South America, termed Caratte by the natives, the botanical characters of which are not known, and from the bark of which the camphor exudes in the form of tears.*

For the *Medical Properties and Uses* of camphor, see pages 686 to 694, Vol. iv. of this work.

* An artificial camphor may be prepared by passing muriatic acid gas through oil of turpentine.

*Krameria Triandra.*

C. Sprat del.

# ORD. POLYGALEÆ.

## KRAMERIA TRIANDRA. TRIANDROUS, OR PERUVIAN KRAMERIA.

*SYNONYMA.* Krameria triandra. *Ruiz. Fl. Peruv. t.* i. *Icon.* 93. *Decand. Prodr. v.* i. *p.* 341. *Mem. Reg. Acad. Matrit. v.* i. *p.* 364.

*Class* IV. Tetrandria. *Order* I. Monogynia.

*Nat. Ord.* Polygaleæ, *Juss.*

*Gen. Char.* *Calyx* of four, rarely of five *leaves*, silky without, coloured within. *Petals* three; two orbicular, the third formed of two or three clawed *petals*, united at their base. *Stamens* three or four, somewhat monadelphous at the base. *Anthers* opening with a double pore. *Fruit* globose, indeluscent, aculeated with bristles, one-celled, one-seeded. *Embryo* straight, in the centre of a fleshy *albumen.—Decand.*

*Spec. Char.* *Leaves* oblong-ovate, rather acute, clothed with silky hairs. *Pedicel* somewhat longer than the leaf, with two bracteas, and forming a short raceme. *Stamens* three.

THE *roots* of this *shrub* are very long, much branched, and spread in every direction; externally of a dark reddish brown, internally red, and having an intensely bitter, styptic taste; the *stem* is procumbent, round, and much branched; the *branches*, when young, white and silky; but, as they grow older, the lower part becomes naked, and acquires a blackish colour. The *leaves* are scattered, sessile, oblong-ovate, pointed, entire, and covered with

a white silky pubescence on both surfaces; the *flowers* are terminal, solitary, and standing upon short *peduncles*. The *calyx* consists of four *leaves* of a deep crimson colour, the inferior ones somewhat larger than the others; they are all smooth and glossy on their internal surface, but sericeous externally. The *corolla* is composed of four *petals*, the two upper being spathulate, the two lower (or *nectaries* of Ruiz and Pavon) roundish, concave, and scale-like. The *stamens* are three; the *filaments* flesh-coloured, and inserted between the superior leaflets of the nectary and the germen; the *anthers* are small, urceolate, and terminated with a bundle of very short hairs, and perforated with two holes at the apex; the *germen* is ovate; *style* awl-shaped, and of a red colour, supporting a simple *stigma*; the germen becomes a dry, globose *drupe*, covered with short, stiff, reddish hairs. Figure (*a*) the pistillum, (*b*) transverse section of the drupe, (*c*) leaves of the nectary, (*d*) a seed, (*e*) the stamens, (*f*) ??

This species of *Krameria** is a native of Peru, delighting in a dry, argillaceous, or sandy soil. It is found growing in great abundance on the declivities of the mountains, (exposed to the intense heat of a vertical sun) in the provinces of Tarma, Huanaco, Caxtambo, and Huamilies. It was first discovered by Don Hypolito Ruiz, in the year 1780, in the provinces of Tarma and Zanca. Humboldt found it in the province of Guancabunba. It grows also in abundance near the city of Huanaco, and in the vicinity of Lima. It flowers throughout the year, but is in the greatest perfection in October and November.

The *roots* of this plant are gathered after the rains. As it comes to market, it consists of pieces of various sizes, but seldom exceeding half an inch in thickness. We are told that large quantities of this root are imported into Portugal, for the purpose of colouring, and improving the astringency of their red wine; and that a saturated tincture of the root in brandy is known by the name of *wine-colouring*. Some of this root and extract, forming part of a Spanish cargo, is said to have been taken by our cruizers, and afterwards sold in London; so that Dr. Reece was enabled to enter upon an investigation of its nature and medicinal qualities: and, in consequence of the facts which he established, it became a favorite medicine, and was also admitted into the list of our Materia Medica.

* The roots are also known by the name of Rhatany, derived from the creeping manner of their growth. *Ed.*

*Sensible and Chemical Properties.* *Rhatany root* is somewhat larger than a goose-quill, it breaks short, and exhibits a woody centre, surrounded with a fibrous red *bark*, of considerable thickness. The internal part of the root is woody, tough, and fibrous, and its flavour insipid and mucilaginous. The cortical part has a bitter, astringent taste; when first chewed, it is somewhat nauseous, but leaves a sweetish impression in the mouth. The watery infusion is of a dark brown colour, with a very astringent bitter taste: sulphate of iron strikes a black colour, and acetate of lead throws down a pale brown precipitate, leaving the infusion nearly colourless; pure alkalies change the colour to a deep claret red. The mineral acids, when added to the infusion, throw down copious precipitates: but no precipitate is caused by either acetic, citric, or the oxalic acids.

The cortical part of *Rhatany root*, when digested in alcohol or ether, yields a deep, reddish-brown tincture: the latter solution is not of so deep a colour as the former, which, when poured into water, lets fall a copious, pink coloured precipitate. The ethereal tincture, when evaporated on water, leaves a pellicle of dark red resin on the surface, and a portion of extractive is diffused through the water, giving to it a pale brown colour. According to Vogel, the constituents of 100 parts of the root, contained 40,00 of a peculiar principle, 1,50 of mucilage, 0,50 starch, 48,00 fibrine, and 10,00 of water and loss. The extract of *Rhatany root* which is prepared in South America, by the natives, who inspissate the expressed juice of the root in the sun, to a proper consistence, we are told by Vogel, when heated, swells very much, and melts; and in this it differs from Kino, which becomes charred by heat, without producing any change in its form. From the above experiments, we may couclude that the cortical part of the root contains resin, gum, fecula, some gallic acid, and tannin—but Gmelin could not detect in it any gallic acid; and Peschier thinks it contains a peculiar acid, which he has callèd *Krameric*, and which forms crystallizable permanent salts with alkalies. The ashes of *Rhatany* contain pure lime, carbonate of lime, sulphate of lime, carbonate of magnesia, and silex.

*Medical Properties and Uses.* *Rhatany root* is a powerful astringent; it is also somewhat tonic, and corroborant, and may be given in many cases in which medicines of this class are indicated. In Peru it has been long in use, and much esteemed as an efficacious remedy in dysentery, diarrhœa, &c. We are told by Alibert, that it has been used with success in France, in

cases of leucorrhœa, and Sir Henry Halford has prescribed it with beneficial effects, in passive uterine hæmorrhage. It has also been given with advantage in the advanced stage of typhus fever, also in intermittents, chronic rheumatism, and many diseases arising from a debilitated state of the digestive organs. As a general tonic it has proved equally beneficial, and often more speedy in its effects than the peruvian barks; and also where the latter disagree with the stomach, it will be found a valuable substitute. As a styptic, it has been applied to wounds with good effects; it has also been employed as a detergent in ulceration of the gums, and for fixing the teeth, when they become loosened by the receding of the gums; and for the latter purpose, the tincture, diluted with an equal proportion of water, forms an admirable lotion. As a dentifrice, equal parts of *Rhatany root* and powdered charcoal, will be found more efficacious than probably any other in use; especially when the gums are in a soft and spongy state. *Rhatany root* may be given in substance, in doses of from ten to thirty grains, repeated three or four times in the day. It may also be administered in decoction or infusion, or in the form of tincture or extract. The tincture (which is the mode in which it is generally exhibited on the Continent) is prepared by digesting three ounces of the bruised root, half an ounce of Serpentaria root, one drachm of hay saffron, and two ounces of orange-peel, in two pints of proof-spirit: of this tincture, two or three tea-spoonfuls may be taken, diluted with an equal quantity of water, three or four times a day. The infusion is prepared by pouring eight ounces of boiling water upon half an ounce of the bruised root; of which, from one to two ounces may be taken for a dose, and repeated every six or eight hours. The decoction is made by boiling two ounces of the bruised root in one pint of boiling water, and may be given in doses equal to the infusion. The extract, which is also much used, we have administered in doses of from ten to twenty grains, with much benefit. Although *Rhatany root* is not in general use in this country, we are warranted in saying it is a valuable addition to our Materia Medica.

Off. The root.

Fishhook or Gum-Ammoniac-Plant.

G. Spratt del

# ORD. UMBELLATÆ.

## HERACLEUM GUMMIFERUM. GUM-BEARING HERACLEUM.

*Class* Pentandria. *Ord.* Digynia.

*Nat. Ord.* Umbellatæ, *Linn.* Umbelliferæ, *Juss.*

*Gen. Char.* *Fruit* elliptical, emarginate, compressed, striated, margined. *Corolla* unequal, inflexed, emarginate. *Involucre* caducous.

THE London and Edinburgh Colleges, on the authority of Willdenow, have admitted this plant into their Materia Medicas, as the one which affords the *Gum ammoniacum* of the shops; but it is doubtful if it really be the individual vegetable. Willdenow reared a plant from seed, found in the ammoniacum of the shops, and named it *Heracleum gummiferum*, and although he could not obtain any of the gum-resin from it, he entertained no doubt of its being the plant which furnishes the drug.* Mr. Jackson, in

* The root is tapering, a span in length, fleshy, whitish, and twice divided at the apex; the stem rises three feet in height, is branched, erect, about an inch thick at the base, deeply furrowed, and sparingly furnished with hairs. The branches are opposite and divaricated; the radical leaves a span in length, cordate, three-lobed, toothed, pubescent on the under side, and supported on roundish, channelled, furrowed petioles; the stem-leaves are opposite, somewhat cordate, three or four inches long, toothed, on petioles, the margin of the base of which is leafy, ventricose, and sheathing. The umbels are large and many-rayed, composed of many-flowered, convex umbellules; the involucre is polyphyllous, with linear, lanceolate, deciduous leaflets; the involucels are of the same form as the involucre, but permanent. The marginal flowers are hermaphrodite and rayed; the central hermaphrodite, without the germen: the margin of the calyx is obsolete. The

his account of Marocco, informs us that *Ammoniacum*, called *Feshook* in Arabic, is produced from a plant similar to European *Fennel*, but much larger. In most of the plains of the interior, and particularly about El traiche and M'sharrah Rummellah, it grows ten feet high. The *Gŭm ammoniac* is procured by incisions made in the *branches*, which, when pricked, emit a lacteous, glutinous, juice; this being hardened by the heat of the sun, falls on the ground and mixes with the red earth below; hence the reason that *Gum ammoniac* of Barbary does not suit the London market. It might, however, with a little trouble be procured perfectly pure; but when a prejudice is once established against any particular article, it is difficult to efface it. The gum in the above-mentioned state is used in all parts of that country for cataplasms and fumigations. The sandy soil which produces the *gum ammoniac*, abounds in the north of Marocco. It is remarkable that neither bird nor beast is seen where this plant grows; the vulture only excepted. It is, however, attacked by a beetle, having a long horn proceeding from its nose, with which it perforates the plant, and makes the incisions whence the gum oozes out.*

*Qualities and Chemical Properties, &c.* *Gum ammoniac* has a peculiar, faint odour, and a bitter, sweetish, and somewhat acrid taste, which is retained for some time in the mouth. It comes to us in the form of tears, yellow externally, and white within; it is brittle, and breaks with a vitreous

marginal flowers have a pentapetalous, unequal corolla; ihe two outer petals being large, dilated, and somewhat cordate; and the three inner inflex, cordate, aud half the size only of the others. The central flowers are pentapetalous, equal, with inflex, cordate petals; the filaments are five, cappillary, with roundish anthers. There is no germen in the central flowers; but in the marginal it is oblong, inferior; styles inserted into a glandular body, crowned with capitate stigmas. The fruit is oblong, slightly emarginate, consisting of two striated seeds, convex on one side, on the other plane.

* The plant we have figured was copied from Mr. Jackson's drawing, published in his account of the Empire of Marocco. It will be seen to differ most essentially from Willdenow's account of the *Heracleum gummiferum*.

Mr. Jackson had many opportunities of becoming familiar with the plant which yields the *ammoniacum;* but unfortunately (not being a botanist) has neither given a scientific description, nor a correct botanical drawing; but unquestionably, his figure is characteristic of the plant: hence, preferable to Willdenow's figure and scientific description of a plant raised from a seed, as before stated, which might probably be the seed of a totally different plant.

fracture, is adhesive in the warm hand, softens by heat, but does not melt. At a candle, it takes fire, softens, some of it drops, and throws out sparkles; the flame is bright and smoky. In a ladle, it boils, takes fire from a flame brought near it, and leaves a hollow, black, shining, dry charcoal. It is partly soluble in water, the solution is milky, and deposits on standing, a resin. Alcohol dissolves about 50 per cent.; the tincture is very limpid, and smells but weakly of the ammoniac; on adding water it becomes milky, and the odour of the gum becomes more sensible, but very little is precipitated. Ether dissolves about 60 per cent. leaving a gum which possesses the taste of the ammoniac; the solution on evaporation, yields a yellowish-white, insipid resin. Distilled with water or alcohol, nothing comes over but the pure liquors. According to the analysis of Braconnot, 100,0 of gum ammoniac, contain 70,0 parts of resin, 18,4 gum, 4,4 glutinous matter, and 6,0 water, 1,2 parts being lost in the process.* Nitric acid converts the resin into a yellow matter, which imparts a permanent yellow dye to silk.

*Medical Properties and Uses.* *Gum-ammoniac* is deobstruent, antispasmodic, diuretic, and stimulating. In large doses, it is purgative, excites perspiration, and increases the flow of urine. As a deobstruent it is efficacious in visceral obstructions, hysteria, and chlorosis; in long and obstinate cholics, proceeding from viscid matter lodged in the intestines, this gum has been administered with decided benefit, after other aperients and carminatives have been used without success. It is prescribed with advantage to promote expectoration in some pulmonary diseases, especially asthma and chronic catarrh; but, on account of its stimulating quality, it must be exhibited with caution, where any inflammatory action may be present.

As a topical remedy, it is applied to promote the suppuration of hard tumours, and as a discutient in white swellings of the joints. In the form of plaister, or a solution of it in vinegar, it has been recommended for resolving schirrous swellings. Internally it may be exhibited in doses of from ten to thirty grains, in substance, or diffused in water in the form of emulsion. It may also be given in combination, with ipecacuanha, tartar emetic, squills, &c. to promote its expectorant powers, as circumstances may require; or joined with bitters, iron, fœtid gums, or myrrh, to increase its deobstruent and antispasmodic effects.

**Off.** The Gum resin. **Ammoniac.**

* Thomson's Chemistry.

THE figure of this plant, together with its botanical description, and medicinal properties, will be found in Vol. II. of this work; but the recent valuable discoveries of the French chemists, render a particular account of the analysis of its seeds eminently interesting and important. From the recent experiments of M. Pelletier, it appears, that the *nux vomica* contains two very active alkaline substances, to which the names of *Strychnine* and *Brucine* have been given; and to these substances, *nux vomica* owes its deleterious and medicinal properties.

*Strychnine.* This substance is prepared as follows:—"Add a solution of liquid subacetate of lead to a solution in water of alcoholic extract of *nux vomica*, until no more precipitate is thrown down; separate the lead by sulphuretted hydrogen; filtrate it, and boil with magnesia, which will unite with the acetic acid, and precipitate the strychnine. Wash the precipitate in cold water, re-dissolve it in alcohol, to separate the excess of magnesia, and by evaporating the alcohol, the strychnine is obtained in a state of purity: if not perfectly white, it must be re-dissolved in acetic acid, or hydrochloric acid, and re-precipitated by means of magnesia."*

When slowly crystallized, it appears under the form of microscopical crystals, forming four-sided prisms, terminated by pyramids, with four flattened or depressed faces. Crystallized rapidly, it is white and granular; it is insupportably bitter to the taste, has no smell, is not changed by exposure to the air, is neither fusible nor volatile, is decomposed by a degree of heat inferior to that which destroys most vegetable substances. Exposed to the naked fire, it swells, becomes black, and gives out an empyreumatic oil, a little water, acetic acid, carbonic acid gas, and carbonated hydrogen; it is scarcely

* Magendie's Formulaire.

soluble in water, requiring 2,500 parts of boiling water. The principal character of Strychnine consists in its forming neutral salts when united with acids; these salts are crystallizable, and for the most part soluble, and are much more active than the simple substance: it is therefore thought that when the system is habituated to the action of pure Strychnine, the salts may be substituted, without increasing the dose.

*Sulphate of Strychnine.* This salt, if neutral, crystallizes in small transparent cubes, and in needles, if the acid preponderates; it is soluble in less than ten parts of cold water, and decomposed by every soluble, salifiable basis. It consists of, sulphuric acid 9,5, Strychnine 90,5—100.*

*Hydrochlorate of Strychnine.* This salt is very soluble, and crystallizes in needles, which, viewed through a lens, appear to be quadrangular prisms; when exposed to a temperature at which the base is decomposable, it gives off muriatic acid.

*Nitrate of Strychnine.* This salt crystallizes in needles of a pearly aspect; it is much more soluble in hot than cold water. It forms very soluble salts with the oxalic, tartaric, and acetic acids, susceptible of crystallization, especially if the acid be in excess. The action of this salt (the nitrate) is more energetic than that of the strychnine itself.

*Phosphate of Strychnine* crystallizes in four-sided prisms, and can only be obtained in a perfectly neutral state, by double decomposition.

*Subcarbonate of Strychnine* is obtained in the form of white flakes. Boiled with iodine, it forms an *iodate* and hydriodate.

BRUCINE. This substance is prepared by following the process already detailed for the separation of Strychnine; and when care is taken to crystallize the Strychnine several times in alcohol, it becomes pure, and free from Brucine; which latter being much more soluble in alcohol, remains in the alcoholic mother waters, from which this substance may then be obtained by farther evaporation.†

The presence of *Brucine* in *Strychnine*, M. Magendie says, is no great inconvenience; as the *Brucine* is possessed of properties similar to those of *Strychnine*, only less active. "In the *St. Ignatius' Bean*, and in the *Upas*, *Brucine* bears the same relation to *Strychnine*, that *Cinchonine* does to *Qui-*

* According to MM. Dumas and Pelletier, 100 parts of the base saturate, 10,486 of acid.

† Brucine had been previously found in the *Angustura Spuria*.

*nine* in the *Cinchonas*. The most active Cinchonas contain the most Quinine, whilst St. Ignatius' bean and the *Upas*, which are much more active than the *nux vomica*, contain little Brucine, and much Strychnine. The *Strychnine* is almost pure in the *Upas*."* Crystallized Brucine is a true hydrate; its affinity for water is very considerable, whilst pure Strychnine is not susceptible of passing into a state of hydrate. Brucine is extremely bitter, sparingly soluble in water, although more so than Strychnine; when regularly crystallized, it is under the form of oblique prisms, with parallelogramic bases; it fuses at a temperature nearly equal to that of boiling water, and in cooling, assumes the consistence of wax. Like Strychnine, it combines with acids, and forms neutral salts. By analysis, it appears to consist of—

| | |
|---|---|
| Carbon | 75,04 |
| Azote | 7,22 |
| Hydrogen | 6,52 |
| Oxygen | 11,21 |
| | 100 |

### SALTS OF BRUCINE.

*Sulphate.* This salt crystallizes in long needles, resembling four-sided prisms, terminated by extremely delicate pyramids. It is very soluble in water and in alcohol; its taste is exceedingly bitter. It is decomposed by soda, ammonia, potass, baryta, lime, strontian, magnesia, strychnine and morphine. The super-sulphate crystallizes more readily than the neutral salt, and is formed of sulphuric acid, 8,84,5, Brucine, 91,16,51,582.

*Hydrochlorate.* This salt crystallizes in four-sided prisms, terminated by an oblique surface. It is not acted upon by the air, and is very soluble in water. It is decomposed by sulphuric acid, nitric acid destroys it. It consists of—Acid, 5,953--4,575. Brucine, 94,046,72,5.

The *phosphate* is also crystallizable, very soluble, and slightly efflorescent. The *nitrate* forms a mass somewhat resembling gum. The *acetate*, *oxalate*, and *tartrate*, may also be crystallized.

*Remedial Effects, &c. of Nux Vomica, and its Preparations.*—M. Magendie, having by a series of experiments† ascertained that the whole of the family of plants of the *Strychni amari*, had the singular property of acting immediately and powerfully on the spinal marrow, without affecting, except in-

* Brucine is obtained in large quantities from the bark of the *Brucea anti-dysenterica*, by a process nearly similar to that directed for the preparation of Strychnine.

† Read before the French Institute in 1809.

directly, the functions of the brain, thought they might be advantageously applied to the treatment of disease. He soon put his newly discovered remedy boldly to the test, and his conjecture, he says, "was verified by numerous experiments made at the bed-side;"—and he also adds, "I have seen the best effects follow the employment of the alcoholic extract of the *nux vomica*, not only in cases of both partial and general paralysis, but also in many other states of weakness of the constitution, both general and partial."* Dr. Fouquier of the *Hôpital de la Charité* at Paris, has tried the *nux vomica* very extensively, and in many cases, he says, with perfect success. He gives it in the form of powder or alcoholic extract; four of the former, or two of the latter, from two to six times a day. In half an hour after administration, the paralysed muscles have, in some cases, begun to evince contraction; sometimes, however, it produces a tremulent effect, stupor and a sense of intoxication—and when pushed too far, general tetanus, and other distressing symptoms. Dr. Good says, "like all other powerful medicines, in their first and indiscriminate application, the *nux vomica* appears sometimes to have been highly beneficial, sometimes mischievous, and sometimes to have produced violent effects upon the nervous system, without an important change of any kind."† A grain of the alcoholic extract, absorbed from any part of the body, or mixed with food, destroys a dog of considerable size,‡ by inducing paroxysms of tetanus, which, by their continuance, stop the respiration, being enough to produce asphyxia; when the dose is much stronger, the animal appears to perish entirely, from the action of the substance on the nervous system.‖ The action of this extract on the healthy human body is precisely the same, and if the dose be sufficiently large, death soon follows with the same symptoms.§ The traces of the asphyxia, which

* M. Magendie gives the following direction for preparing the extract:—"Take a determinate quantity of rasped *nux vomica*, exhaust it by repeated maceration in alcohol of 40° Baumé, sp. gr. 817 British, and evaporate it slowly to the consistence of an extract."

† Good's Study of Medicine.

‡ The *vomic nut*, however, does not appear to be equally poisonous to all animals. Loss informs us, that a hog may eat a considerable quantity of the nuts, without suffering in the smallest degree. Desportes gave two very large doses of it to a goat, without doing it any harm.

‖ Magendie's Formulaire.

§ Marcet, in his Memoir on the action of poisons on vegetable substances, informs us, that a bean plant, watered with a solution of extract of *nux vomica*, was killed in a day and a half.—*Journal of Sciences, Literature, and the Arts, No.* xxxix. *p.* 194.

caused death, are alone observable on dissection. On man, when affected with paralysis, the effect is the same; but it is particularly manifested in the paralysed parts: it is there the tetanic symptoms occur, with a creeping sensation, which announces the action of the remedy. A local perspiration also breaks out in the same parts. In cases of hemiplegia, the halves of the body exhibit a striking contrast, one side being at rest whilst the other is violently agitated; tetanic shocks soon succeed, and an abundant perspiration breaks out.

In one female, the affected side was covered with a peculiar eruption, when the opposite shewed no trace of it; a decidedly bitter taste was likewise perceived on one side of the tongue, while no such sensation occurred on the other. When a larger dose is given, the sides of the body participate unequally in the tetanic effect, so that the patient is sometimes thrown out of bed by the violence of the paroxysm. When given in very small doses, the extract has not any perceptible effect immediately, and some days elapse before its advantageous or noxious properties can be appreciated.* M. Magendie says that this extract may be given in all diseases attended with debility, local or general, also in cases of weakness of the genital organs, incontinence of urine, sluggish digestion, and in states of extreme debility, attended by an irresistible disposition to sleep.

The extract is administered in the form of pills, containing a grain each; one or two may at first be given daily, and gradually increased until the desired effect is produced; the medicine must then be discontinued to prevent accidents, and if it has been suspended for some days, it is necessary to recommence with the smaller doses, gradually increasing them as before. When it is wished to produce only slow effects, one grain, or a grain and a half in the day, is sufficient. The action of strychnine on man and animals is exactly like that of the alcholic extract of *nux vomica*, but it is much more active.

One-eighth of a grain is sufficient to kill a large dog; and one fourth of a grain often produces very marked effects on the human body when in health. M. Andral says that the action of strychnine is so violent, that it ought not to be employed, except with the greatest precaution; its effects, likewise, he found to vary very considerably; in one case, one-twelfth of a grain was sufficient to produce serious symptoms, whilst in another, more

* Magendie's Formulaire.

than a grain was given almost with impunity. We are told by M. Magendie, that strychnine may be used in all cases where the resin of *nux vomica* would be serviceable. When employed in cases where paralysis is connected with an inflammatory condition of the brain or spinal marrow, it may probably aggravate the symptoms; we think, however, that it is one of those dangerous and even uncertain remedies, which ought not to be resorted to except in the most desperate cases. It is said to be more especially useful in that kind of paralysis, the cause of which cannot be referred to any injury of the nervous centres; particularly to that species, to which persons are liable who meddle with preparations of lead. Some cases of cure by the use of *Strychnine* and *Brucine*, under these circumstances, are recorded.—*Brucine* appears to possess the same properties as *Strychnine*, but in a much milder degree; so that it may be given to the extent of two or three grains for a dose, in the same cases where *Strychnine* would be indicated. M. Magendie relates two cases of atrophy, in which he administered *Brucine* with success; one of the leg, and the other of the arm: the patients took six pills in the day, of one-eighth of a grain each.

*Mode of employing Strychnine and its Preparations.*—

PILLS OF STRYCHNINE.

Take of very pure Strychnine . . . . . 2 grains
Conserve of Roses . . . . . ½ gros
Mix, and divide into 24 very equal pills.

MIXTURE OF STRYCHNINE.

Take of Distilled Water . . . . . 2 ounces
Pure Strychnine . . . . . 1 grain
White Sugar . . . . . 2 gros
Acetic Acid . . . . . 2 drops
Mix.—Five grammes, or a dessert spoonful, to be taken morning and evening.

TINCTURE OF STRYCHNINE.

Take of Alcohol at 36° . . . . . 1 ounce
Strychnine . . . . . 3 grains Mix.

Dose from six to twenty-four drops, in draughts, or common drink, avoid-

ing acidulated drinks, as Strychnine, united with acids, forms soluble salts, which are more active than Strychnine itself.

The preparations of *Brucine* are similar to those of *Strychnine:* but as the former is more powerful than the latter, the preparations of *Brucine* may be exhibited in larger doses.

---

## ATROPINE.

THIS substance was discovered by Brande, in the *Atropa Belladonna,* and it is in this peculiar substance, that he considers the medicinal and deleterious properties of the *Belladonna* to reside.* To obtain this principle, M. Brande boiled two pounds of the dried leaves of the *Atropa Belladonna* in a sufficient quantity of water, pressed out the decoction, and boiled the leaves again in some more water. The decoctions were mixed, and some sulphuric acid was added in order to throw down the albumen and similar bodies: the solution was thus rendered thinner, and passed more readily through the filter. The decoction was then supersaturated with potass; by which he obtained a precipitate, weighing, after having been washed with pure water, and dried, 89 grains. It consisted of small crystals, from which, by solution in acids, and precipitation by alkalies, *Atropine* was obtained in a state of purity.† Or *Atropine* may be obtained by digesting the decoction of the herb of the *Atropa Belladonna* with magnesia; boiling the precipitate in alcohol, and filtering: the *Atropine* crystallizes on cooling, in needles or colourless transparent prisms.‡

* The *Atropa Belladonna,* on analysis, yielded the following constituents:—Wax 0,7; resinous chlorophylle 5,84; acid malate of *atropine* 1,51; gum 8,03; fecula 1,25; woody fibre 13,7; phyteumacolle 6,9; a matter analogous to osmazome, with malate of atropine, oxalate, hydrochlorate, and sulphate of potass, 16,05; soluble albumen 4,7; hard albumen 6; ammoniacal salts and acetates, malate of *atropine,* oxalate, malate sulphate, hydrochlorate, and nitrate of potass; oxalate malate (?) and phosphate of lime, and malate and phosphate of magnesia 7,47; water 25,8; loss 2,05. The ashes contain oxide of copper.—***Brande and Vauquelin.***

† Ure's Chemical Dictionary, Art. *Atropia.*

‡ Chimie Organique, par Léopold Gmelin, édition de Virey, *p.* 398.

*Properties of Atropine.* According to M. Brande, *Atropine* varies in appearance, depending on the method by which it is obtained, crystallizing only when perfectly pure. It is in the form of white crystals, more soluble in hot than in cold alcohol; almost insoluble in water, insoluble in ethera nd the oils. It forms, with acids, neutral crystallizable salts.

*Action of Atropine on the Animal Economy.* When M. Brande was experimenting on the alkali, he was obliged to desist, in consequence of the violent head-aches, pains in the back, and giddiness, with frequent nausea, which the vapour of the salt occasioned. It had, indeed, so injurious an effect upon his health, that he has entirely abstained from further experiments, and no one has hitherto repeated them. He once tasted a small quantity of the sulphate of atropine; the taste was not bitter, but merely saline: there soon followed, however, violent headache, shaking in the limbs, alternate sensations of heat and cold, oppression of the chest, difficulty of breathing, and diminished circulation of the blood. The violence of these symptoms ceased in half an hour. The vapour even, of the various salts of atropine, produces vertigo. When exposed for a long time to the vapours arising from a solution of nitrate, phosphate, or sulphate of *Atropine*, the pupil of the eye becomes dilated. This occurred frequently to M. Brande; and when he tasted the salt of Atropine, the dilatation followed to so great a degree, that it continued for twelve hours, and was not influenced by the different shades of light.* We have not learnt that the salts of Atropine have been employed medicinally. M. Brande has also succeeded in obtaining from the seeds of the *Hyoscyamus niger* and the *Datura stramonium* two alkaline principles of a similar nature to *Atropine;* to these he had given the names of *Hyosciamine* and *Daturine*. His account of these principles, however, is imperfect; but on them the active properties of the plant depend.

* Schweigger's Journal, 28. i; Report. de Buchner, xi. 71; Ure's Dictionary of Chemistry, 1823; and Formulary of several new Remedies, by J. Haden, *p.* 119.

# VERATRINE.

It is by this substance that almost all the individuals of the family of *Veratrum* exert their common action over the animal frame. For this discovery we are indebted to those indefatigable chemists, MM. Pelletier and Caventou, who, having observed that the whole tribe of plants belonging to this genus possess a very acrid taste, and produce similar effects, concluded that these properties depended upon a peculiar substance pervading them all. They first analysed the seeds of the *Veratrum Sabadilla*, which confirmed their conjectures. They isolated an acid alkaline principle, which they called *Veratrine*, from the name of the family to which it belonged. They ultimately discovered it in the root of the *Colchicum autumnale*, and in that of the *white Helebore*, *(Veratrum album)*. The latter yielded to MM. Pelletier and Caventou—1, a fatty matter, composed of oil, adipocire, and an acid similar to the sevadic, but incrystallizable; 2, yellow extractive colouring matter; 3, acid gallate of *Veratrine;* 4, gum; 5, fecula; 6, woody fibre—ashes containing carbonate of potass and lime, sulphate of lime and silica.

The analysis of the *Veratrum Sabadilla* furnished the following constituents:—1, a fatty compound, composed of oil, adipocire, and cevadic acid; 2, wax; 3, yellow extractive colouring matter; 4, *Veratrine*, forming with gallic acid an acid salt; 5, gum; 6, woody fibre. The ashes, which were small in quantity, were almost wholly composed of the carbonate and phosphate of lime, with some traces of the hydrosulphate and carbonate of potass, and silica.

The roots of the *Colchicum autumnale* yield on analysis—1, a fatty matter, composed of oil, adipocire, and a volatile acid; 2, yellow extractive matter; 3, acid gallate of *Varatrine;* 4, gum; 5, fecula, with Inuline and woody fibre. It yields very few ashes.*

* Pelletier and Caventou.

*Preparation of Veratrine.* They repeatedly digested the seeds of the *Veratrum Sabadilla* in boiling alcohol. These tinctures, filtrated whilst almost boiling, deposited, on cooling, whitish flakes of wax. They re-digested the matter which remained dissolved, after evaporating it to the consistence of an extract, in cold water; a small quantity of fatty matter now remained on the filter. The solution was slowly evaporated, and it formed an orange yellow precipitate, which possessed the characteristics of the colouring matter found in almost all the woody vegetables. On adding a solution of acetate of lead to the liquor, which was still deeply coloured, a new and very abundant yellow precipitate was immediately formed, which was separated by means of the filter. The liquor, now nearly colourless, still contained, amongst other substances, the acetate of lead, which had been added in excess; a current of hydrosulphuric acid was used to separate the lead. The liquor was then filtrated and concentrated by evaporation, treated by magnesia, and again filtrated. The magnesian precipitate was digested in boiling alcohol. The alcoholic liquors yielded, on evaporation, a pulverulent substance, which was extremely acrid, and possessed all the properties of the alkalies. This substance was at first yellowish; but by solutions in alcohol, and subsequent precipitations, caused by pouring water into the alcoholic solutions, it was obtained in the form of a very white and perfectly inodorous powder.*

*Chemical Properties of Veratrine.* Veratrine is scarcely at all soluble in cold water; boiling water, however, dissolves one-thousandth part of its weight and becomes sensibly acrid. It is very soluble in ether, and still more so in alcohol. It is insoluble in the alkalies, and soluble in all vegetable acids. It saturates all the acids, and forms with them incrystallizable salts, which, on evaporation, take the appearace of gum. The sulphate alone affords rudiments of crystals, when its acid is in excess.

Nitric acid combines with Veratrine; but if added in excess, especially when concentrated, it does not produce superoxidation, as in the cases of morphine and strychnine; but very rapidly resolves the vegetable substance into its

* M. Meissner, who discovered the Veratrine nearly at the same time as MM. Pelletier and Caventou, recommends the seeds of the *Ceradilla* to be treated with undiluted alcohol, the alcoholic infusion to be evaporated, the residuum treated with water, the liquor filtered, and the Veratrine to be precipitated by the carbonate of potass; it then only remains to wash the precipitate with water.—*Chimie Organique de Gmelin, p.* 400.

elements, and gives birth to a yellow, detonating matter, analogous to the *bitter of Welther*.

Veratrine restores the blue of turnsol paper, when reddened by acids. Exposed to the action of heat, it liquifies at a temperature of 50° (122° Fahr.) above zero, and has then the appearance of wax; on cooling, it forms an amber-looking mass, of a translucent appearance. Distilled on the naked fire, it swells up, becomes decomposed, and produces water, much oil, &c. A voluminous, carbonaceous mass remains, which, when incinerated, leaves only a very slightly alkaline residuum.*

*Action of Veratrine on Animals.* A very small quantity of acetate of Veratrine, thrown into the nostrils of a dog, instantly provokes violent sneezing, which sometimes continues for nearly half an hour. One or two grains (gr. 0,82 or 16,4 troy) placed in the gullet, immediately occasion copious salivation, which continues for some time.

If a small quantity be thrown into any part of the intestinal canal, and the body be opened to observe the effects, the intestine is found to become much indurated, and to relax and contract alternately for a certain time. The part of the mucous membrane which comes in contact with the Veratrine, is inflamed; the irritation spreads, and vomiting and purging are produced.

In much larger doses, the substance induces a very great acceleration of the circulation and of respiration, which is soon followed by tetanus and death. The effects are still more rapid, if one or two grains be thrown into the pleura, or into the tunica vaginalis. In less than ten minutes death occurs, preceded by tetanic convulsions. The same quantity, thrown into the jugular vein, also induces tetanus and death in a few seconds. Dissection shews, even in this case, that the Veratrine has produced an effect on the intestinal canal; for the mucous membrane is found to be highly injected. The lungs also present signs of inflammation and of engorgement.

*Action of Veratrine on Man, in a state of health and disease.* The effects of Veratrine in a large dose have not been observed on man; they would, however, doubtless be the same as those which are noticed in animals.

The taste of Veratrine is very acrid, but without bitterness; it excites a very copious salivation, however small the quantity may be which is put into the mouth. Though Veratrine is absolutely inodorous, it is inconvenient to smell at it too closely, when in a state of powder; for even this small

* Magendie's Formulaire, 4th edition.

quantity which is thus carried into the nostrils, is often sufficient to produce violent sneezing, which may become dangerous.

A dose of a quarter of a grain (gr. 0,205 troy) rapidly induces very abundant alvine evacuations. If the dose be augmented, more or less violent vomiting is occasioned. M. Orfila lately gave it in the dose of two grains (gr. 1,64 troy) in the twenty-four hours, without producing too many alvine evacuations. The subject of this case was an old man, who had been struck with apoplexy some time previously. This circumstance forms an additional proof of the influence which the nervous system possesses over the mode of action of medicines. After having cautiously tasted the mixture which contained the two grains (gr. 1,64 troy) of Veratrine, M. Orfila experienced, for several hours, an almost insupportably acrid sensation in the mouth and pharynx, the impression of which had not entirely disappeared on the following day. The patient felt no such inconvenience.

*Medical Properties of Veratrine.* Veratrine produces the same effects as the plants from which it is extracted;* hence, it may be very advantageously substituted for them, because it permits the active substance used to be estimated, which the others do not.

*Veratrine* is particularly applicable in cases where it is necessary to excite quickly a strong action of the bowels. When given with this intention, it has answered very well in the case of old people, where an enormous accumulation of fæces existed in the large intestines.

* Vide Veratrum Album, vol. ii, *p.* 757 *& seq.*

## GENTIANINE.

For the discovery of this alkali we are indebted to MM. Henry and Caventou.* *Gentian root*, according to the analysis of the above-named gentlemen, contains—1, a very fugacious, odorous principle , 2, a yellow, crystalline, bitter principle *(gentianine);* 3, a matter identical with bird-lime; 4, a fixed oil; 5, a greenish substance; 6, a free organic acid; 7, incrystallizable sugar; 8, gum; 9, a yellow colouring matter; 10, woody fibre.†

*Preparation of Gentianine.* Digest powdered gentian-root in cold ether, which, at the expiration of forty-eight hours, furnishes a greenish-yellow tincture; this being filtered, poured into an open vessel, and exposed to heat, (if the liquor be sufficiently concentrated,) upon cooling, settles into a yellow crystalline mass, possessing a decided smell and taste of gentian. This mass is to be digested in alcohol, until it ceases to give a lemon colour; the washings are to be added together and exposed to a slight heat: the yellow crystalline mass then re-appears, which, towards the end of the evaporation, becomes solid. This mass is very bitter. If re-digested in more weak alcohol, the whole will be re-dissolved, except a certain portion of oily matter.

This last spirituous solution, besides the bitter principle of the gentian, contains an acid substance, and its odorous matter also.

* A singular circumstance attended the discovery of this substance, which deserves to be recorded. Both these gentlemen were employed at the same time in this pursuit, without being aware of the coincidence. Their results were so identical, that it almost appeared as if they had acted in concert; they therefore agreed to publish their labours conjointly—"A remarkable fact," says M. Magendie, "first, because it proves how perfect the means of analyzing vegetables have recently become: and secondly, because it shows the change which the progress of science has made in those who follow scientific pursuits. One hundred years ago, such a coincidence would have produced a violent quarrel, whilst now it only induces a feeling of joy in those who find their discoveries confirmed by others."

† Schrader discovered a resinous and narcotic principle in it; M. Planche also asserts that he found the latter.

Upon evaporating this liquor to dryness, washing the residue in water, adding a little well-washed calcined magnesia, boiling and evaporating in a water-bath, the greater part of the odorous matter of the gentian is driven off; the bitter acid is also taken up by the magnesia, and the yellow bitter principle remains partly free, and partly combined with the magnesia, to which it gives a fine yellow colour. The greater part of the bitter principle may then be obtained pure and isolated, by boiling the magnesia in ether, and evaporating the solution. If it be wished to separate the greater part of the bitter principle which remains in the magnesia in a fixed state, and which could not be taken up by the ether, we may treat it with oxalic acid, in a quantity sufficient to produce slight acidity. The acid unites with the magnesia; and the bitter principle, which is left free, may be obtained by the means pointed out above.

*Properties of Gentianine.* This substance is yellow, inodorous, possessing very strongly the aromatic bitter taste of the gentian, which is much increased by solution in an acid. It is very soluble in ether and in alcohol, and may be separated from them by spontaneous evaporation, in the form of very small, yellow, needle-like crystals. It is much less soluble in cold water, which, nevertheless, it renders extremely bitter; in boiling water it is more readily dissolved. Diluted alkalies deepen its colour very much, and dissolve rather more of it than water will alone.

Acids weaken its yellow colour very sensibly; its solutions in the phosphoric and sulphuric acids, are even almost colourless. Those with the weaker acids, as the acetic, are yellowish. Concentrated sulphuric acid carbonizes it, and destroys its bitterness. Exposed in a glass tube to the heat of boiling mercury, *Gentianine* sublimes in the form of small, yellow, crystalline needles, and is partially decomposed. It has no sensible effect on turnsol, either when blue, or reddened by acids. It appears to be neutral.

*Action of Gentianine on the Animal System.* M. Magendie has ascertained by experiments that this substance has no poisonous quality. Several grains injected into the veins produced no sensible effect. M. Magendie himself swallowed two grains dissolved in alcohol, and was merely sensible of the extreme bitter taste, and a slight sensation of heat in the stomach.

*Medical Employment.* M. Magendie prefers the tincture for general purposes, prepared according to the following formula :—

Take of Alcohol at 24° . . . . . 1 ounce
Gentianine . . . . . 5 grains
This may be substituted for the tincture of gentian of the pharmacopœias.

SYRUP OF GENTIANINE.

Take of Simple Syrup . . . . . 1 pound
Gentianine . . . . . 16 grains Mix.

This is probably one of the best bitters that can be employed in scrophulous affections.

---

## DELPHININE OR DELPHINE.

THIS vegetable alkali was discovered in 1819, by MM. Feneulle and Lassaigne, in the seeds of the *Delphinium Staphisagria*, (savesacre) who named it *Delphine*, from a supposition that the acrid properties of the whole tribe depended upon this principle. We have not learnt, however, that any other species of *Delphinium* have been chemically examined.

To obtain the alkali, boil the seeds of the *staphisagria*, cleared of their husks and ground to a fine paste, in a little distilled water; pass the decoction through a linen cloth, and filtrate it. Add very pure magnesia, and boil for some minutes; filtrate again; wash the residue carefully, and digest in highly rectified alcohol. On evaporating the solution, *Delphine* is obtained in the form of a white powder, which affords some points of crystallization. It may be obtained also by acting with diluted sulphuric acid on the seed, unshelled, but well bruised: the solution is to be precipitated by subcarbonate of potass, and the precipitate acted on by alcohol; but when obtained by this process, it is very impure.

*Properties of Delphine.* Delphine, when pure, is in the form of a white powder, which, when wet, is crystalline, but becomes opaque on exposure to the atmosphere. It is inodorous, and has a bitter, acrid taste. Alcohol and ether dissolve it very readily. The alcoholic solution acts powerfully in turn-

ing the syrup of violets green, and restores the blue of turnsol paper, when reddened by acid. *Delphine* forms, with nitric, oxalic, acetic, hydrochloric, and sulphuric acids, very soluble neutral salts, the taste of which is extremely acrid and bitter. Alkalies precipitate it in the form of a white jelly. *Delphine* exists in the seeds of the *Staves acre*, in combination with malic acid, and in company with the following principles:—1, a brown bitter matter, precipitable by acetate of lead; 2, volatile oil; 3, fixed oil; 4, albumen; 5, animalized matter; 6, mucus; 7, saccharine mucus; 8, yellow bitter principle, not precipitable by the acetate of lead; 9, mineral salts.—*Annales de Chimie*, xii. *p.* 358.

*Action of Delphine on Animals.* Orfila has recently made some experiments with this substance. In doses of six grains, (gr. 4,92 troy) it proves fatal to dogs. Its deleterious effects are more speedily induced when it is dissolved in weak acetic acid; the animal, we are told, in this case, dies in the course of from forty to fifty minutes. It appears to exert its action principally on the nervous system. It likewise produces local irritation, giving rise to inflammation, when death has not immediately followed; inflammation, however, does not appear to be a necessary consequence of its noxious action on the stomach.*

*Delphine* has not been employed medicinally.

* Nouveau Journal de Médecine, x. 38.

---

## SOLANINE.

THIS substance has been very recently discovered by M. Desfosses, an apothecary at Besançon, in two species of the genus *Solanum*,—viz. *Solanum nigrum*, (nightshade) and in the *Solanum Dulcamera*, (bitter-sweet). It has been found to exist in both these plants; in the latter, it is evidently contained in the leaves, but the leaves of the former afford no traces of it. It is found most abundantly in the berries of the nightshade, where it exists in the state of a malate.

*Preparation of Solanine.* To obtain this substance, digest the filtrated juice of these berries in ammonia; a greyish precipitate falls, which when washed on a filter, and digested in boiling alcohol, gives, by evaporation, the *Solanine* in a state of sufficient purity, if perfectly ripe berries have been acted upon; but if green berries have been acted on, the *Solanine* is mixed with a certain portion of chlorophylle, or green colouring principle, which cannot be separated without considerable difficulty.

*Properties of Solanine.* This substance, when perfectly pure, is in the form of an opaque, white or pearly powder. It is inodorous; its taste is nauseous and slightly bitter; and its bitterness is promoted by solution in acids, especially the acetic. Its salts are incrystallizable; the solutions by evaporation give gummy, transparent masses, which may be readily powdered. It unites with acids; even in the cold and perfectly neutral, solutions may be obtained, if care be used. Its alkaline properties are slightly manifested by its action on turmeric, and it restores the blue of turnsol paper, when reddened by acids. It is saturated by a very small portion of acid. It is insoluble in cold water, and hot water dissolves one-eight-thousandth part only.

*Action of Solanine on the Animal Economy.* From experiments made with this alkali on animals, it appears that a few grains excite violent vomiting, followed by a disposition to sleep. Four grains were introduced into the stomach of a dog, which produced violent vomiting, followed by a sleep of several hours. Eight grains were insufficient to cause death in a young cat. After vomiting violently, the animal slept soundly for more than thirty-six hours. On man, a very small quantity of Solanine occasions great irritation in the throat, and excites a nauseous bitter flavour in the mouth; which is more intense, if the substance be dissolved in a small quantity of acetic acid. It appears to resemble opium in producing vomiting and sleep; but whilst its emetic properties are more apparent than in opium, its narcotic effects are evidently much less so. The acetate of Solanine is the only salt which has been tried on man, nor has it been administered in cases of disease, but it might probably be used with advantage, where the *nightshade* or *Dulcamera* are indicated.

# NARCOTINE.

NO vegetable in the *Materia Medica* has occupied more of the attention of chemists than the *somniferous poppy*, and its product, opium. No accurate chemical analysis of this substance (Opium) was instituted till the year 1803, when Derosnes, Sertuerner, Seguin, and others, undertook the investigation.* To Derosnes we are indebted for the discovery of *Narcotine*. This active constituent of opium, is obtained by exhausting the crude opium in two parts of boiling ether, and repeating the operation five successive times. The solution obtained by this process, is then mixed and filtered, and the ether volatilized, until the whole is reduced to three-fourths. The product consists of two distinct parts; of a saline crust, consisting of Narcotine united with an acid; and of a brown, bitter, acid liquor, also containing Narcotine; an acid, and a resin. To obtain the Narcotine from this liquor, it must be subjected to evaporation, the residuum treated with boiling water, and the Narcotine precipitated from the filtered liquor by ammonia. The Narcotine is afterwards to be separated from the resin and caoutchouc, by treating the saline crust, in which it is contained, with rectified oil of turpentine, and washing the residuum with cold alcohol. This residuum is then dissolved in hot alcohol, and the Narcotine precipitated by ammonia. The two precipitates are then dissolved in the least possible quantity of hydrochloric acid, and again precipitated by ammonia. The Narcotine thus obtained, crystallizes in fine needles, or rhomboidal prisms. It has no action on vege-

* According to the analysis of Sertuerner, Robiquet, and Derosne, crude opium is composed of—1, a fixed oil; 2, a matter analogous to caoutchouc; 3, a vegeto-animal substance, not yet investigated; 4, mucilage; 5, feculent matter; 6, resin; 7, vegetable fibre; 8, *narcotine;* 9, meconic acid; 10, another vegetable acid; and 11, morphine.—*Annales de Chimie et Physique, vol.* v. *p.* 275.

table colours, is without smell or taste, slightly soluble in cold alcohol, while boiling alcohol dissolves one twenty-fourth of its weight. Hot ether dissolves it freely, and suffers it to crystallize on cooling. According to M. Magendie a single grain of pure Narcotine, dissolved in oil, and given to a dog, produced a state of stupor, but very different from sleep, and death generally in twenty-four hours. Narcotine, combined with acetic acid, he found to occasion quite a different effect, twenty-four grains having been given to an animal without its perishing. While under its influence, he says, they are agitated by convulsions, similar to those produced by an over-dose of camphor: the same signs of fright, the same incapability of going forward, the foaming at the mouth, and convulsion of the jaws. The most interesting, and indeed, the most important experiment related by Magendie, was the action of the combined substances, morphine and Narcotine, on a dog. He dissolved a grain of each in acetic acid, and introduced the mixture into the pleura of the animal, which soon fell asleep; but he says a very remarkable struggle appeared to go on for an hour between the strangulating effects of the Narcotine, and the anodyne effects of the morphine; at last the animal slept, probably under the influence of the morphine. He adds, "may it not be inferred from this experiment, which I have often repeated in various ways, and with analogous results, that the variable effects of opium are to be attributed to their containing these so opposite principles?" From these experiments of Magendie, M. Robiquet was tempted to prepare an extract of opium which should be entirely devoid of Narcotine. For this purpose, he macerates bruised opium in cold water, filtrates and evaporates to the consistence of a thick syrup, which he digests in rectified ether, and after frequent shakings, decants the solution; the ether is then separated by distillation. This operation is repeated as long as any crystals of Narcotine appear as the residue of the distillation. When the crystals can no longer be discovered, he evaporates the solution to a pilular consistence, which he considers as entirely devoid of Narcotine.

M. Magendie, in recommending this new preparation of opium to the attention of physicians, says, "I have tried the extract, thus prepared, on animals; its action appears to be decidedly narcotic, and entirely like that of morphine, only weaker." Mr. Haden, the able translator of Magendie's work on these new preparations, very properly observes, that "the freedom from Narcotine, which characterizes the *extractum opii*, (which is aqueous)

ought to recommend it to medical men, as preferable to the tincture of opium, which contains narcotine in abundance, on account of its being a spirituous solution."* We have ourselves known many persons who could not use any other preparation of opium but the watery extract; this new preparation of opium, therefore, deserves the attention of physicians.

## MORPHINE.

This substance does not exist in opium in its pure alkaline state, but united to an acid, to which the name of meconic acid has been given. According to M. Brande, the ultimate elements contained in pure morphine are—

| | |
|---|---|
| Carbon | 72 |
| Nitrogen | 5,50 |
| Hydrogen | 5,50 |
| Oxygen | 17 |
| | 100 |

Mr. Bussy, chemical operator at L'Ecole de Pharmacie, has also found it to contain a small quantity of azote, about one-twentieth. M. Robiquet adopted the following method for obtaining morphine:—he boiled a very concentrated solution of opium for fifteen minutes with a small quantity of magnesia, in the proportion of ten grains of the latter to one pound of the former. The greyish deposit produced by this operation, he collected on a filter, and washed it with cold water. When this precipitate was well dried, he heated it for some time with weak alcohol, at a temperature below boiling. By this process, he separated much of the colouring matter, and a very little morphine. The precipitate he then filtered, and washed by means of a little alcohol; after which it was strongly boiled in a large quantity of the same

* This extract, however, contains some of Derosne's salt also, or narcotine, as it is called; and this is supposed to produce the excitement, which even the aqueous extract occasions, previous to its sedative effect. M. Robiquet (Journal de Pharmacie, May, 1821) proposes to free it of this principle, by agitating the extract as soon as it acquires the consistence of syrup, with ether, and repeating this agitation with fresh portions of ether, as long as the extract on distillation deposits any crystals of narcotine. The extract thus prepared, contains only morphia, gum, and extractive.

spirit rectified. The liquor being again filtered, while in a state of ebulition, the morphine separates as it cools. The colouring matter is afterwards got rid of by repeated crystallization. Dr. Thompson gives the following, which he considers an easy method of procuring morphine in a state of purity. He precipitates a strong infusion of opium, by means of caustic ammonia; this precipitate he separates by the filter; the infusion is then evaporated to one sixth its volume, and a new precipitate obtained, by again treating the infusion with caustic ammonia; this precipitate is morphine, mixed with colouring matter: when sufficient time has been given for the deposit to form, he separates it by means of the filter, and washes it with cold water. After it is sufficiently drained, he sprinkles it with alcohol, which passes through the filter, dissolving and carrying with it a large portion of the colouring matter, and a little morphine. The remaining morphine is then dissolved in acetic acid, and any colouring matter removed, by treating the solution with a little ivory black: the mixture being often shaken during twenty-four hours, and then thrown on the filter. The liquid passes through perfectly colourless, and by treating it a third time with the caustic ammonia, the morphine falls down in the form of a white powder. By dissolving this base in alcohol, and allowing the solution to evaporate spontaneously, the morphine is obtained in the form of beautiful crystals, each a rectangular, four-sided prism.*

*Morphine* or Morphia, when in a state of purity, is in the form of brilliant crystals, possessing many characteristic properties of the alkalies; white, with a silky lustre, greasy to the touch, and friable. Its crystals are tetrahedral prisms, whose bases are rhomboids, more rarely single or double pyramids; sometimes it is found in slender prisms, collected into bundles. It is of greater specific gravity than distilled water; it is inodorous; has an astringent and bitter taste. It is soluble in acids, ether, and alcohol, but scarcely so in water, four hundred parts of which, according to Derosnes,† are required to dissolve one part. It unites with all the acids, except the carbonic, forming neutral salts. It restores the blue colour of litmus paper, forms an intense blue with the persalts of iron, and reddens with nitric acid. It decomposes the salts of mercury and lead, muriate of copper, and the sulphate of iron; but forms a triple salt with acetate of copper. It melts when heated, and crystallizes in cooling. It burns readily, and when heated in

* Vide Annals of Philosophy, for June 1820. † Annales de Chimie, vol. xiv.

close vessels, gives out carbonate of ammonia; and a solid, black, resinous kind of matter remains.*

The salts of morphine are more soluble than morphine itself. The sulphate and acetate are also generally employed in medicine. Magendie says "I employed the acetate, the sulphate, and the hydrochlorate of morphine, and found that these salts afford all the advantages which we can expect to meet in opium, without any of its inconveniences." The acetate of morphine, which has been introduced into the Paris Pharmacopœia, is prepared as follows:—Take four parts of morphine, and of distilled water, eight parts; dilute the morphine in a porcelain vessel, and add acetic acid of the specific gravity, 1,075, until turnsol paper is scarcely tinged red; evaporate the solution, and continue the evaporation until the salt may be collected, and reduced to powder. Morphine, as well as its acetate, is prescribed in doses of from one-eighth of a grain to a grain. In Paris it is usually administered in the form of a syrup, composed of the acetate and honey.† Dr. Thompson says, "the combination of Morphia, its acetate, and citrate, may be used in the same diseases, and with the same intention, as opium. The result of my own experience inclines me to regard the acetate as well adapted for cases of phthisis and in inflammatory affection, where it is of importance to obtain the sedative effect of the remedy, free from the exciting quality. As the *cordiate* is the natural compound of Morphia in opium, it is likely to prove still more useful."‡

* Our readers who may wish for further information on the various methods for obtaining morphine, narcotine, and their combinations, and also their effects on the animal economy; we must refer them to the essay of M. Derosnes, Annales de Chimie, vol. xiv. M. Sertuerner, on the same subject, Ann. de Chim. et Phys. vol. v. p. 21; on the action of morphia and narcotine, by M. Magendie, Journ. de Physiol. Expér.; a paper on the same subject, by M. Orfila, Ann. de Chim. et Phys. vol. v. p. 288; Report of M. Lodibert, Bulletin de la Société de Phar. vol. i. p. 87; and also to a paper by Dr. Ure in the Quarterly Journal of Science, for May, 1830.

† Magendie's Formulaire.

‡ London Disp.

# GENERAL LATIN INDEX

TO

# VOL. V.


| | Page. |
|---|---|
| **A** | |
| Aloe vulgaris | 98 |
| *Avena sativa* | 107 |
| **B** | |
| *Bonplandia trifoliata* | 120 |
| *Boswellia serrata* | 117 |
| **C** | |
| *Cephaclis Ipecacuanha* | 14 |
| *Cinchona cordifolia* | 29 |
| *Cinchona lancifolia* | 27 |
| *Cinchona oblongifolia* | 30 |
| *Coculus palmatus* | 21 |
| *Croton Tiglium* | 71 |
| **D** | |
| *Diosma crenata* | 52 |
| Dryobalanops Camphora | 124 |
| **E** | |
| *Euphorbia officinarum* | 74 |
| **F** | |
| *Fucus vesiculosus* | 111 |
| **H** | |
| *Heracleum gummiferum* | 132 |
| *Hordeum distichon* | 105 |
| *Humulus Lupulus* | 90 |
| **K** | |
| Krameria triandra | 129 |
| **L** | |
| *Laurus Cassia* | 88 |
| *Linum catharticum* | 63 |
| *Lythrum Salicaria* | 65 |
| **M** | |
| *Melaleuca Cajuputi* | 57 |
| *Myroxylon Peruiferum* | 48 |
| **P** | |
| *Pinus Balsamea* | 1 |
| *Piper Cubeba* | 95 |
| *Pterocarpus erinaceus* | 44 |
| *Pyrola umbellata* | 37 |
| **Q** | |
| *Quassia excelsa* | 60 |
| *Quercus Infectoria* | 4 |
| **R** | |
| *Ranunculus Flammula* | 54 |
| *Rheum undulatum* | 81 |
| *Rhus Toxicodendron* | 67 |
| *Roccella tinctoria* | 108 |
| **S** | |
| *Salix alba* | 8 |
| *Salix capræa* | 7 |
| *Scrophularia nodosa* | 42 |
| *Solidago Virgaurea* | 12 |
| *Stalagmitis Cambogioides* | 78 |
| **T** | |
| *Triticum hybernum* | 101 |

# GENERAL ENGLISH INDEX

TO

# VOL. V.


A

Page.

Aloe, yellow-flowered . . . 98

B

Balm of Gilead Fir . . . 1
Balsam-tree, sweet-smelling . . . 48
Bark, Peruvian . . . 26
Barley, common . . . 105
Bladderwrack, or Fucus . . 111
Bonplandia, three-leaved . . 120
Boswellia, serrated, or Gum-Olibanum-tree . . . . 119

C

Cajeput-tree, lesser . . . 57
Calumba-root, or palmated Cocculus . 22
Camphor-tree, or Dryabalanops . 124
Cassia-tree . . . . 88
Cocculus, palmated, or Calumba-root . 22
Croton, purging . . . 71
Crowfoot, lesser spearwort . . 54
Cubebs, or Java-pepper . . 95

D

Diosma, crenated . . . 52
Dryobalanops, or Camphor-tree . 124

E

Euphorbium, officinal or spurge . 74

F

Figwort, knobby-rooted . . 42
Fir, Balm of Gilead . . . 1
Flax, purging, or Mill-mountain . 63
Fucus-bladder, or Bladder-wrack . 111

G

Gamboge-tree .. . . 78
Golden-rod, common . . . 12
Gum Olibanum-tree, or serrated Boswellia . . . . 119

H

Page.

Heracleum, gum-bearing . . 133
Hop . . . . . 90

I

Ipecacuan . . . . 14

K

Kino-tree, or African Pterocarpus . 44
Krameria, Peruvian, or triandrous . 129

L

Loose-strife, or purple willow-herb . 65

M

Mill-mountain, or purging Flax . 63

O

Oak, staining . . . . 4
Oat, common . . . . 107
Orchal, or Dyer's Rock-moss . . 108

P

Pepper, Java, or Cubebs . . 95
Poison-oak, or pubescent Sumach . 67
Pterocarpus, African, or Kino-tree . 44

Q

Quassia, lofty, or ash-leaved . . 60

R

Rhubarb, Chinese, or waved-leaved . 81
Rock-moss, or dyer's lichen, or Orchal 108

S

Sallow, round-leaved . . . 7
Spurge, or officinal Euphorbium . 74
Sumach, or pubescent Poison-oak . 67

W

Wheat, winter . . . 101
Willow, common-white . . 8
Willow-herb, purple, or Loose-strife . 65
Winter-green, umbel-flowered . 37

# INDEX,

*In which the Latin and English names of all the Plants contained in the Five Volumes, are arranged according to the*

## NATURAL METHOD

*Of* Jussieu, *with the improvements of* De Candolle, *and other succeeding Botanists.*


### I. RANUNCULACEÆ, *Juss.*

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Clematis recta, *Linn.* | 3 | 171 | 480 |
| *Virgin's Bower, upright* | | | |
| Anemone pratensis, *Linn.* | 3 | 170 | 468 |
| *Pasque-flower, or Meadow Anemone* | | | |
| Ranunculus flammula, *Linn.* | 5 | 15 | 54 |
| *Spearwort Crowfoot, lesser* | | | |
| Ranunculus acris, *Linn.* | 3 | 172 | 482 |
| *Crowfoot, upright meadow* | | | |
| Helleborus niger, *Linn.* | 3 | 169 | 473 |
| *Black Hellebore, or Christmas Rose* | | | |
| Helleborus fœtidus, *Linn.* | 3 | 170 | 477 |
| *Bear's-foot, or Stinking Hellebore* | | | |
| Delphinium Staphysagria, *Linn.* | 3 | 168 | 471 |
| | 5 | | 150 |
| *Stavesacre, or palmated Larkspur* | | | |
| Aconitum Napellus, *Linn.* | 3 | 165 | 461 |
| *Wolf's-bane, or Monk's hood* | | | |
| Pœonia officinalis, *Retz* | 3 | 173 | 485 |
| *Peony, common* | | | |

### II. MAGNOLIACEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Wintera aromatica, *Sol.* | 4 | 226 | 647 |
| *Winter's Bark tree* | | | |

### III. MENISPERMACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Cocculus palmatus, *De Cand.* | 5 | 7 | 22 |
| *Calumba root, or palmated Cocculus* | | | |
| Cissampelos Pareira, *Lam.* | 1 | 65 | 167 |
| *Pareira Brava Cissampelos* | | | |

### IV. BERBERIDEÆ, *Vent.*

| | | | |
|---|---|---|---|
| Berberis vulgaris, *Vent.* | 3 | 219 | 618 |
| *Barberry, common* | | | |

### V. PAPAVERACEÆ, *De Cand.*

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Papaver somniferum, *Linn.* | 2 & 5 | 138 | 376 |
| *Poppy, white* | | | |
| Papaver Rhœas, *Linn.* | 2 | 139 | 378 |
| *Poppy, red, corn* | | | |
| Chelidonium majus, *Mill* | 2 | 140 | 388 |
| *Celandine, greater, or common* | | | |

### VI. FUMARIACEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Fumaria officinalis, *Linn.* | 3 | 164 | 458 |
| *Fumitory, officinal* | | | |

### VII. CRUCIFERÆ, *Juss.*

| | | | |
|---|---|---|---|
| Sisymbrium Nasturtium, *Linn.* | 3 | 144 | 398 |
| (*Nasturtium officinale, De Cand. Prodr. vol.* i. *p.* 137) | | | |
| Water Cress | | | |
| Cardamine pratensis, *Linn.* | 3 | 143 | 396 |
| *Lady's-smock, or Cuckoo-flower* | | | |
| Cochlearia Armoracia, *Linn.* | 3 | 145 | 400 |
| *Horse-radish* | | | |
| Cochlearia officinalis, *Linn.* | 3 | 142 | 394 |
| *Scurvy-grass, common* | | | |
| Erysinium officinale, *Linn.* | 3 | 147 | 406 |
| (*Sisymbrium officinale, De Cand. Prodr. vol.* i. *p.* 191.) | | | |
| *Hedge Mustard* | | | |
| Erysinium Alliaria, *Linn.* | 3 | 148 | 407 |
| (*Alliaria officinalis, De Cand. Prodr. vol.* i. *p.* 196.) | | | |
| *Sauce alone, or Stinking Hedge Mustard* | | | |
| Sinapis nigra, *Linn.* | 3 | 146 | 403 |
| *Mustard, black* | | | |

## VIII. CAPPARIDEÆ, *Juss.*

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Capparis spinosa, *Linn.* *Caper-bush, common* | 2 | 141 | 391 |

## IX. CISTINEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Cistus, Creticus, *Linn.* *Cistus, Cretan* | 3 | 207 | 584 |

## X. VIOLŒRIEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Viola odorata, *Linn.* *Sweet Violet* | 2 | 89 | 251 |
| Viola Tricolor, *Linn.* *Pansie, or three-coloured Violet* | 2 | 90 | 254 |

## XI. POLYGALEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Polygala Senega, *Linn.* *Rattlesnake-root, or Milkwort* | 3 | 162 | 452 |
| Krameria triandra, *Ruiz* *Peruvian, or Triandrous Krameria* | 5 | 35 | 129 |

## XII. CARYOPHYLLEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Dianthus Caryophyllus, *Linn.* Clove Pink | 3 | 205 | 579 |
| Saponaria officinalis, *Linn.* *Soapwort* | 3 | 206 | 581 |

## XIII. LINEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Linum Usitatissimum, *Linn.* *Flax, common* | 3 | 202 | 566 |
| Linum Catharticum, *Linn.* *Mill-mountain, or Purging Flax* | 5 | 18 | 63 |

## XIV. MALVACEÆ, *Brown.*

| | | | |
|---|---|---|---|
| Malva Sylvestris, *Linn.* *Mallow, common* | 3 | 199 | 554 |
| Althæa officinalis, *Linn.* *Marsh-mallow* | 3 | 198 | 552 |

## XV. DIPTEROCARPEÆ, *Blume.*

| | | | |
|---|---|---|---|
| Dryobalanops Camphora, *Gærtn.* *Camphor-tree* | 5 | 34 | 124 |

## XVI. TERUSTROMIACEÆ, *Mirb.*

| | | | |
|---|---|---|---|
| Thea viridis, *Linn.* *Tea-tree* | 4 | 225 | 641 |

## XVII. AURANTIACEÆ, *Corr.*

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Citrus Aurantium, *Risso* *Orange-tree* | 3 | 188 | 523 |
| Citrus Medica, *Risso* *Lemon-tree* | 3 | 189 | 528 |

## XVIII. HYPERICINEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Hypericum perforatum, *Linn.* *Perforated St. John's-wort* | 3 | 208 | 587 |

## XIX. GUTTIFERÆ, *Juss.*

| | | | |
|---|---|---|---|
| Stalagmitis Cambogioides, *Murr.* *Gamboge-tree* | 5 | 23 | 78 |
| Canella alba, *Murr.* *Canella, laurel-leaved* | 4 | 237 | 694 |

## XX. HIPPOCASTANEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Æsculus Hippocastanum, *Linn.* *Horse-chestnut, common* | 3 | 217 | 613 |

## XXI. MELIACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Swietenia Mahogani, *Linn.* *Mahogany-tree* | 3 | 220 | 620 |

## XXII. AMPELIDEÆ, *Humb. et B.*

| | | | |
|---|---|---|---|
| Vitis vinifera, *Linn.* *Vine, common* | 1 | 57 | 144 |

## XXIII. TROPÆDEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Tropæolum majus, *Linn.* *Nasturtium, or greater Indian Cress* | 3 | 218 | 616 |

## XXIV. OXALIDEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Oxalis Acetosella, *Linn.* *Wood-sorrel* | 3 | 201 | 563 |

## XXV. XYGOPHYLLEÆ, *Linn.*

| | | | |
|---|---|---|---|
| Guaiacum officinale, *Linn.* *Guaiacum, officinal* | 3 | 200 | 557 |

## XXVI. RUTACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Ruta graveoleas, *Linn.* *Rue, common* | 3 | 174 | 487 |
| Dictamnus albus, *Pers.* *Bastard Dittany, or White Fraxinella* | 3 | 166 | 465 |

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Diosma crenata, *Linn.* | 5 | 14 | 52 |
| *Diosma, crenated* | | | |
| Bonplandia trifoliata, *H. & B.* | 5 | 33 | 120 |
| (*Galipea Cusparia, De Cand. Prod. vol.* i. *p.* 731.) | | | |
| *Bonplandia, three-leaved* | | | |
| **XXVII. SIMARUBEÆ, *Rich.*** | | | |
| Quassia Simaruba, *Linn.* | 3 | 203 | 569 |
| *Simaruba Quassia* | | | |
| Quassia Amara, *Linn.* | 3 | 204 | 574 |
| *Quassia, bitter* | | | |
| Quassia excelsa, *Swartz* | 5 | 17 | 60 |
| *Quassia, lofty, or ash-leaved* | | | |
| **XXVIII. RHAMNEÆ, *Brown.*** | | | |
| Rhamnus Catharticus, *Linn.* | 3 | 210 | 594 |
| *Buckthorn, purging* | | | |
| **XXIX. TEREBINTHACEÆ, *Juss.*** | | | |
| Pistæcia Leutiscus, *Linn.* | 1 | 11 | 26 |
| *Mastich-tree* | | | |
| Pistachia Terebinthus, *Linn.* | 1 | 12 | 29 |
| *Turpentine-tree, Chian* | | | |
| Rhus Coriaria, *Linn.* | 3 | 213 | 601 |
| *Sumach, elm-leaved* | | | |
| Rhus Toxicodendron, *Linn.* | 5 | 20 | 67 |
| *Poison-oak, or pubescent Sumach* | | | |
| Boswellia serrata, *Colebr.* | 5 | 32 | 117 |
| *Gum Olibanum-tree, or Serrated Boswellia* | | | |
| Amyris Gileadensis, *Linn.* | 3 | 214 | 603 |
| *Balm of Gilead Amyris* | | | |
| **XXX. LEGUMINOSÆ, *Juss.*** | | | |
| Myroxylon Peruiferum, *Linn.* | 5 | 13 | 48 |
| (*Myrospermum Peruiferum, De Cand.*) | | | |
| *Balsam-tree, sweet-smelling* | | | |
| Toluifera Balsamum, *Mill* | 3 | 215 | 607 |
| (*Myrospermum Toluiferum, De Cand. Prodr.*) | | | |
| *Balsam of Tolu-tree* | | | |
| Spartium scoparium, *Linn.* | 3 | 150 | 413 |
| (*Cytisus Scoparius, De Cand. Prod.*) | | | |
| *Broom, common* | | | |
| Trigonella Fænum Græcum, *Linn.* | 3 | 154 | 426 |
| *Fenngreek* | | | |
| Glycyrrhiza glabra, *Linn.* | 3 | 152 | 420 |
| *Liquorice, common* | | | |
| Astragalus exscapus, *Linn.* | 3 | 155 | 428 |
| *Milkvetch, stemless* | | | |
| Astragalus Tragacantha, *Linn.* | 3 | 149 | 410 |
| *Goat's-thorn Milkvetch* | | | |
| Dolichos pruriens, *Linn.* | 3 | 153 | 422 |
| *Cowhage* | | | |
| Pterocarpus erinaceus, *Lam.* | 5 | 12 | 44 |
| *Kino-tree, or African Pterocarpus* | | | |
| Pterocarpus Santalinus, *Linn.* | 3 | 156 | 430 |
| *Saunder's-tree, red* | | | |
| Mimosa Catechu, *Linn.* | 3 | 157 | 433 |
| (*Acacia Catechu, De Cand. Prodr.* v. ii, *p.* 458.) | | | |
| *Catechu Mimosa* | | | |
| Mimosa Nitotica, *Linn.* | 3 | 158 | 438 |
| (*Acacia vera, De Cand. Pr. v.* ii. *p.* 461) | | | |
| *Egyptian Thorn, or Mimosa* | | | |
| Geoffroya inermis, *Linn.* | 3 | 151 | 416 |
| (*Andira inermis, De Cand.*) | | | |
| *Bastard Cabbage-tree, or smooth Geoffroya* | | | |
| HomatoxylonCampechianum, *Linn.* | 3 | 163 | 455 |
| *Logwood* | | | |
| Tamarindus Indica, *Jacq.* | 3 | 161 | 448 |
| *Tamarind-tree* | | | |
| Cassia Fistula, *Linn.* | 3 | 160 | 445 |
| *Cassia, purging* | | | |
| Cassia Senna, *Linn.* | 3 | 159 | 442 |
| (*Cassia Lanceolata, De Cand. Prod.*) | | | |
| *Senna, or Egyptian Cassia* | | | |
| Copaifera officinalis, *Jacq.* | 3 | 216 | 609 |
| *Balsam of Copaiva-tree* | | | |
| **XXXI. ROSACEÆ, *Juss.*** | | | |
| Amygdalus communis, *Linn.* | 3 | 183 | 507 |
| *Almond-tree* | | | |
| Amygdalus Persica, *Linn.* | 3 | 184 | 511 |
| (*Persica vulgaris, De Cand. Prodr.*) | | | |
| *Peach-tree, common* | | | |

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Prunus spinosa, *Linn.* *Sloe-tree* | 3 | 186 | 518 |
| Prunus domestica, *Linn.* *Plum-tree, or common Prune* | 3 | 187 | 520 |
| Prunus Lauro-Cerasus, *Linn.* (*Cerasus Lauro-cerasus, De Cand.*) *Cherry Laurel, common* | 3 | 185 | 513 |
| Geum urbanum, *Linn.* *Avens, common* | 3 | 181 | 502 |
| Rubus Idæus, *Linn.* *Raspberry-bush* | 3 | 176 | 492 |
| Potentilla reptans, *Linn.* *Cinque-foil, common* | 3 | 175 | 490 |
| Tormentilla erecta, *Linn.* (*Potentilla Tormentilla, De Cand.*) *Tormentil, common, or upright Septfoil* | 3 | 182 | 503 |
| Agrimonia Eupatorium, *Linn.* *Agrimony, common* | 3 | 180 | 500 |
| Rosa canina, *Linn.* *Hep-tree, or Dog-rose* | 3 | 177 | 493 |
| Rosa, centifolia, *Linn.* *Rose, Hundred-leaved* | 3 | 178 | 495 |
| Rosa Gallica, *Linn.* *Rose, red, officinal* | 3 | 179 | 498 |
| Pyrus Cydonia, *Linn.* *Quince-tree* (*Cydonia vulgaris, De Cand.*) | 3 | 182 | 505 |

## XXXII. LYTHRARIEÆ, *Linn.*

| | | | |
|---|---|---|---|
| Lythrum Salicaria, *Linn.* *Loose-strife, or purple willow-herb* | 5 | 10 | 65 |

## XXXIII. GRANATEÆ, *Don.*

| | | | |
|---|---|---|---|
| Punica Granatum, *Linn.* *Pomegranate-tree* | 3 | 190 | 531 |

## XXXIV. MYRTAREÆ.

| | | | |
|---|---|---|---|
| Melaleuca Leucadendron, *Linn.* *Cajeput-tree, or Aromatic Leucadendron* | 3 | 195 | 544 |
| Melaleuca Cajuputi, *Roxb.* (*Melaleuca minor, De Cand. Prodr.*) *Cajeput-tree, lesser* | 5 | 16 | 57 |
| Caryophyllus aromaticus, *Linn.* *Clove-tree* | 3 | 193 | 539 |
| Myrtus pimenta, *Linn.* (*Eugenia pimenta, De Cand.*) *Pimenta, Jamaica pepper, or All-spice* | 3 | 194 | 541 |

## XXXV. CUCURBITACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Cucumis Colocynthis, *Linn.* *Coloquintida, or bitter Cucumber* | 2 | 71 | 189 |
| Bryonia alba, *Linn.* *Bryony, white* | 2 | 73 | 194 |
| Momordica Elaterium, *Linn.* *Cucumber, squirting, wild* | 2 | 72 | 192 |

## XXXVI. CRASSULACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Sedum acre, *Linn.* *Stone-crop, or wall-pepper* | 3 | 196 | 548 |

## XXXVII. GROSSULARIEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Ribes rubrum, *Linn.* *Currant, red* | 3 | 191 | 534 |
| Ribes nigrum, *Linn.* *Currant, black* | 3 | 192 | 536 |

## XXXVIII. LAXIFRAGEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Saxifraga granulata, *Linn.* *Saxifrage, white* | 3 | 197 | 550 |

## XXXIX. UMBELLIFERÆ, *Juss.*

| | | | |
|---|---|---|---|
| Eryngium maritimum, *Linn.* *Eryngo, or Sea Holly* | 1 | 46 | 120 |
| Cicuta virosa, *Linn.* *Hemlock, water* | 1 | 39 | 95 |
| Apium Petroselinum, *Linn.* (*Petroselinum sativum, De Cand.*) *Parsley, common* | 1 | 45 | 118 |
| Sium nodiflorum, *Linn.* (*Heliociadium nodiflorum, De Cand.*) *Water-parsnep, creeping* | 1 | 54 | 139 |
| Carum carni, *Linn.* *Carraway, common* | 1 | 41 | 102 |
| Pimpinella Anisum, *Linn.* *Anise* | 1 | 52 | 135 |

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Pimpinella saxifraga, *Linn.* | 1 | 51 | 133 |
| *Burnet-saxifrage, small* | | | |
| Œnanthe crocata, *Linn.* | 1 | 38 | 92 |
| *Dropwort, water-hemlock* | | | |
| Phellandrium aquaticum, *Linn.* | 1 | 37 | 90 |
| (*Œnanthe Phellandrium, De Cand.*) | | | |
| *Water-hemlock, fine-leaved* | | | |
| Anethum Fœniculum, *Linn.* | 1 | 49 | 127 |
| (*Fœniculum vulgare, De Cand.*) | | | |
| *Fennel, common* | | | |
| Ligusticum Levisticum, *Linn.* | 1 | 55 | 141 |
| (*Levisticum officinale, De Cand.*) | | | |
| *Lovage, common* | | | |
| Angelica sylvestris, *Linn.* | 1 | 36 | 89 |
| *Angelica, wild* | | | |
| Angelica Archangelica, *Linn.* | 1 | 35 | 86 |
| (*Archangelica officin. De Cand.*) | | | |
| *Angelica, garden* | | | |
| Pastinaca Opoponax, *Linn.* | 1 | 47 | 122 |
| (*Opoponax Chironium, De Cand.*) | | | |
| *Opoponax, or rough parsnep* | | | |
| Ferula Assafœtida, *Linn.* | 1 | 43 | 111 |
| *Assafetida, or gigantic Fennel* | | | |
| Imperatoria Ostruthium, *Linn.* | 1 | 44 | 116 |
| *Master-wort, common* | | | |
| Bubon Galbanum, *Linn.* | 1 | 40 | 98 |
| *Bubon, lovage-leaved* | | | |
| Anethum graveolens, *Linn.* | 1 | 48 | 125 |
| *Dill, common* | | | |
| Heracleum gumniferum, *Willd.* | 5 | 36 | 133 |
| (*Heracleum pubescens, De C.* iv. 193) | | | |
| *Heracleum, gum-bearing* | | | |
| Cuminum cyminum, *Linn.* | 1 | 56 | 142 |
| *Cummin* | | | |
| Daucus Carota, *Linn.* | 1 | 50 | 130 |
| *Carrot, wild, or Bird's-nest* | | | |
| Conium maculatum, *Linn.* | 1 | 42 | 104 |
| *Hemlock, common* | | | |
| Coriandrum sativum, *Linn.* | 1 | 53 | 137 |
| *Coriander, common* | | | |

## XL. ARALIACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Panax quinquefolium, *Linn.* | 1 | 58 | 149 |
| *Ginseng* | | | |

## XLI. LORANTHACEÆ, *Don.*

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Viscum album, *Linn.* | 1 | 34 | 83 |
| *Missletoe* | | | |

## XLII. CAPRIFOLIACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Sambucus Ebulus, *Linn.* | 3 | 212 | 599 |
| *Elder, dwarf* | | | |
| Sambucus nigra, *Linn.* | 3 | 211 | 596 |
| *Elder, common black* | | | |

## XLIII. RUBIACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Cinchona officinalis, *Linn.* | 2 | 91 | 257 |
| (*Cinchona Condaminea, DeC.* iv. 352) | | | |
| *Peruvian bark, grey* | | | |
| *Peruvian bark, orange* | 5 | | 27 |
| Cinchona cordifolia, *Mutis* | 5 | 8 | 29 |
| (*Cinchona pubescens, De C.* iv. 352) | | | |
| *Peruvian bark, yellow* | | | |
| Cinchona oblongifolia, *Mutis* | 5 | 9 | 30 |
| (*Cinchona magnifolia, De C.* iv. 353) | | | |
| *Peruvian-bark, red* | | | |
| *Cortex Peruvianus, ruber* | 2 | 92 | 267 |
| Coffea Arabica, *Linn.* | 1 | 70 | 182 |
| *Coffee-tree* | | | |
| Cephaclis Ipecacuanha, *Juss.* | 4 | 274 | 810 |
| | 5 | 6 | 14 |
| *Ipecacuanha* | | | |
| Rubia tinctorum, *Linn.* | 1 | 67 | 173 |
| *Madder, dyer's* | | | |
| Galium Aparine, *Linn.* | 1 | 68 | 176 |
| *Cleaver's, or goose-grass* | | | |

## XLIV. VALERIANEÆ, *De Cand.*

| | | | |
|---|---|---|---|
| Valeriana officinalis, *Linn.* | 1 | 32 | 77 |
| *Valerian, officinal* | | | |

## XLV. COMPOSITÆ, *Adans.*

| | | | |
|---|---|---|---|
| Cynara Scolymus, *Linn.* | 1 | 28 | 69 |
| (*Cynara cardunculus, var. Spreng. Syst. Veg.* iii. 369) | | | |
| *Artichoke, common* | | | |
| Arctium Lappa, *Linn.* | 1 | 13 | 32 |
| *Burdock* | | | |
| Centaurea Benedicta, *Linn.* | 1 | 14 | 34 |
| *Thistle, holy or blessed* | | | |

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Tussilago Farfara, *Linn.* *Coltsfoot* | 1 | 18 | 45 |
| Tanacetum vulgara, *Linn.* *Tansy, common* | 1 | 27 | 66 |
| Artemisia vulgaris, *Linn.* *Mugwort* | 1 | 23 | 57 |
| Artemisia Santonica, *Linn.* *Southernwood, Tartarian* | 1 | 25 | 61 |
| Artemisia maritima, *Linn.* *Wormwood, sea* | 1 | 24 | 60 |
| Artemisia Absinthium, *Linn.* *Wormwood, common* | 1 | 22 | 54 |
| Artemisia Abrotanum, *Linn.* *Southernwood, common* | 1 | 21 | 52 |
| Inula Helenium, *Linn.* *Elecampane* | 1 | 26 | 64 |
| Solidago Virgaurea, *Linn.* *Goldenrod, common* | 5 | 5 | 12 |
| Arnica montana, *Linn.* *Arnica, mountain* | 1 | 17 | 41 |
| Matricaria Parthenium, *Linn.* (*Pyrethrum Parthenium, (Sm.) Spreng. Syst. Veg.* iii. 586) *Feverfew, common* | 1 | 30 | 73 |
| Anthemis nobilis, *Linn.* *Pellitory of Spain, or Spanish Camomile* | 1 | 19 | 47 |
| Anthemis Pyrethrum, *Linn.* *Camomile, common* | 1 | 20 | 50 |
| Achillæa Millefolium, *Linn.* *Milfoil, or common Yarrow* | 1 | 15 | 36 |
| Leontodon Taraxacum, *Linn.* *Dandelion, common* | 1 | 16 | 39 |
| Lactuca virosa, *Linn.* *Lettuce, wild, strong-scented* | 1 | 31 | 75 |
| Cichorium Intybus, *Linn.* *Succory, wild, or blue* | 1 | 29 | 70 |

## XLVI. LOBELIACEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Lobelia siphilitica, *Linn.* *Cardinal-flower, or blue Lobelia* | 2 | 88 | 249 |

## XLVII. ERICINEÆ, *Dew.*

| | | | |
|---|---|---|---|
| Arbutus uva-ursi, *Linn.* *Bearberry, or trailing arbutus* | 2 | 100 | 287 |
| Rhododendron Chrysanthum, *Linn.* *Rhododendron, yellow-flowered* | 2 | 103 | 299 |
| Pyrola umbellata, *Linn.* *Winter-green, umbel-flowered* | 5 | 10 | 37 |

## XLVIII. STYRACEÆ, *Rich.*

| | | | |
|---|---|---|---|
| Styrax officinalis, *Linn.* *Storax, officinal* | 2 | 101 | 291 |
| Styrax Benzoin, *Dryandr.* *Benjamin-tree* | 2 | 102 | 294 |

## XLIX. OLEINEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Olea Europæa, *Linn.* *Olive, European* | 2 | 98 | 280 |
| Fraxinus Ornus, *Linn.* *Ash, flowering* | 3 | 209 | 589 |

## L. ASCLEPIADEÆ, *Br.*

| | | | |
|---|---|---|---|
| Asclepias Vincetoxicum, *Linn.* (*Cynanchum Vincetoxicum, (Pers.) Spreng. Syst. Veg.* i. 852.) *Swallow-wort, officinal* | 2 | 93 | 268 |

## LI. APOCYNEÆ, *Br.*

| | | | |
|---|---|---|---|
| Strychnos Nux-vomica, *Linn.* *Vomic or Poison nut* | 2<br>5 | 79 | 222<br>136 |

## LII. GENTIANEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Gentiana lutea, *Linn.* *Gentian, yellow* | 2<br>5 | 95 | 273<br>148 |
| Gentiana purpurea, *Linn.* *Gentian, purple* | 2 | 94 | 271 |
| Chironia Centaurium, *Smith* (*Centaurium Erythræa, (Pers.) Spreng. Syst. Veg.* i. 579.) *Centaury* | 2 | 96 | 275 |
| Menyanthes trifoliata, *Linn.* *Water-trefoil, or Buckbean* | 2 | 97 | 277 |
| Spigelia Marilandica, *Linn.* *Indian-pink, or perennial Worm-grass* | 1 | 69 | 178 |

## LIII. CONVOLVULUCEÆ, *Juss.*

| | | | |
|---|---|---|---|
| Convolvolus Jalappa, *Linn.* *Jalap Bindweed* | 2 | 87 | 246 |

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Convolvulus Scammonea, *Linn.* Scammony Bindweed | 2 | 86 | 243 |
| **LIV. BORAQUIEÆ, *Juss.*** | | | |
| Anchusa tinctoria, *Linn.* *Alkanet, or Dyer's Bugloss* | 2 | 106 | 314 |
| Anchusa officinalis, *Linn.* *Alkanet, or officinal Bugloss* | 2 | 108 | 306 |
| Cynoglossum officinale, *Linn.* *Houndstongue, common* | 2 | 109 | 309 |
| Borago officinalis, *Linn.* *Borage, common* | 2 | 110 | 311 |
| Symphytum officinale, *Linn.* *Comfrey, common* | 2 | 108 | 307 |
| Pulmonaria officinalis, *Linn.* *Lungwort, common* | 2 | 104 | 302 |
| Lithospermum officinale, *Linn.* *Gromwell, common* | 2 | 105 | 303 |
| **LV. SOLANEÆ, *Juss.*** | | | |
| Atropa Belladonna, *Linn.* *Nightshade, deadly* | 2 | 82 | 230 |
| Atropa Mandragora, *Linn.* (*Mandragora Vernalis*, (*Bertol.*) *Spr. Syst. Veg.* i. 699) *Mandrake* | 2 | 83 | 234 |
| Solanum Dulcamara, *Linn.* *Nightshade, woody* | 2<br>5 | 85 | 240<br>151 |
| Solanum nigrum, *Linn.* *Nightshade, garden* | 2 | 84 | 237 |
| Physalis Alkekengi, *Linn.* *Winter-cherry, common* | 2 | 81 | 228 |
| Capsicum Annuum, *Linn.* *Guinea pepper, or annual Capsicum* | 2 | 80 | 226 |
| Hyoscyamus niger, *Linn.* *Henbane, black* | 2 | 76 | 204 |
| Nicotiana Tabacum, *Linn.* *Tobacco, Virginian* | 2 | 77 | 208 |
| Datura Stramonium, *Linn.* *Thorn-apple, common* | 2 | 74 | 197 |
| Verbascum Thapsus, *Linn.* *Mullein, great, broad-leaved* | 2 | 75 | 202 |
| **LVI. ANTIRRHINEÆ.** | | | |
| Gratiola officinalis, *Linn.* *Hedge Hyssop* | 2 | 131 | 360 |
| Scrophularia nodosa, *Linn.* *Figwort, knobby-rooted* | 5 | 11 | 42 |
| Digitalis purpurea, *Linn.* *Foxglove, common* | 2 | 78 | 218 |
| Antirrhinum Linaria, *Linn.* (*Linaria vulgaris*, (*Bauh.*) *Spreng. Syst. Veg.* ii. 796) *Toad-flax, common* | 2 | 136 | 371 |
| **LVII. RHINANTHACEÆ, *De Cand.*** | | | |
| Veronica Beccabunga, *Linn.* *Brooklime, speedwell* | 2 | 132 | 363 |
| Veronica officinalis, *Linn.* *Veronica, officinal, or male Speedwell* | 2 | 133 | 366 |
| Euphrasia officinalis, *Linn.* *Eyebright, common* | 2 | 134 | 368 |
| **LVIII. LABIATÆ, *Juss.*** | | | |
| Rosmarinus officinalis, *Linn.* *Rosemary, common* | 2 | 117 | 329 |
| Salvia officinalis, *Linn.* *Sage, garden* | 2 | 127 | 352 |
| Teucrium Marum, *Linn.* *Herb Mastich, Syrian, or Marum Germander* | 2 | 115 | 324 |
| Teucrium Chamedrys, *Linn.* *Germander, common* | 2 | 130 | 358 |
| Teucrium Scordium, *Linn.* *Germander, water* | 2 | 116 | 327 |
| Mentha Piperita, *Linn.* *Peppermint* | 2 | 120 | 336 |
| Mentha Viridis, *Linn.* *Spear-mint* | 2 | 121 | 338 |
| Mentha Pulegium, *Linn.* *Pennyroyal Mint* | 2 | 122 | 342 |
| Hyssopus officinalis, *Linn.* *Hyssop, common* | 2 | 113 | 318 |
| Lavandula Spica, *Linn.* *Lavender, common* | 2 | 114 | 321 |
| Glechoma hederacea, *Linn.* *Gill, or Ground Ivy* | 2 | 111 | 316 |
| Betonica officinalis, *Linn.* *Betony, wood* | 2 | 128 | 354 |
| Marrubium vulgare, *Linn.* *Horehound, common white* | 2 | 118 | 332 |

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Thymus vulgaris, *Linn.* | 2 | 125 | 347 |
| *Thyme, common garden* | | | |
| Thymus Serpyllum, *Linn.* | 2 | 126 | 350 |
| *Mother of Thyme, or wild Thyme* | | | |
| Origanum vulgare, *Linn.* | 2 | 123 | 344 |
| *Marjoram, wild* | | | |
| Origanum Majorana, *Linn.* | 2 | 124 | 345 |
| *Marjoram, sweet* | | | |
| Origanum Dictamnus, *Linn.* | 2 | 129 | 356 |
| *Dittany of Crete* | | | |
| Melissa officinalis, *Linn.* | 2 | 119 | 334 |
| *Balm, common* | | | |
| **LIX. VERBENACEÆ.** | | | |
| Verbena officinalis, *Linn.* | 2 | 133 | 364 |
| *Vervain common* | | | |
| Vitex Agnus-castus, *Linn.* | 2 | 137 | 373 |
| *Chaste-tree* | | | |
| **LX. PLANTAGINEÆ, *Juss.*** | | | |
| Plantago major, *Linn.* | 1 | 33 | 81 |
| *Waybread, or common Plantain* | | | |
| **LXI. CHENOPODEÆ, *Juss.*** | | | |
| Salsola Kali, *Linn.* | 4 | 227 | 650 |
| *Saltwort, prickly* | | | |
| Chenopodium Vulvaria, *Linn.* | 4 | 228 | 656 |
| (*Chenopodium olidum*, (*Sm.*) *Spreng. Syst. Veg.* i. 921) | | | |
| *Orache, or stinking Goosefoot* | | | |
| **LXII. POLYGONEÆ, *Juss.*** | | | |
| Polygonum Bistorta, *Linn.* | 4 | 232 | 668 |
| *Snake-weed, or greater Bistort* | | | |
| Rumex Acetosa, *Linn.* | 4 | 230 | 660 |
| *Sorrel, common* | | | |
| Rumex Hydrolapathum, *Linn.* | 4 | 229 | 658 |
| *Dock, water* | | | |
| Rheum palmatum, *Linn.** | 4 | 231 | 662 |
| *Rhubarb, officinal* | | | |
| Rheum undulatum, *Linn.* | 5 | 24 | 81 |
| *Rhubarb, Chinese, or wave-leaved* | | | |
| **LXIII. LAURINEÆ, *Juss.*** | | | |
| Laurus nobilis, *Linn.* | 4 | 235 | 678 |
| *Sweet Bay, common* | | | |
| Laurus Cinnamomum, *Linn.* | 4 | 233 | 670 |
| *Cinnamon-tree* | | | |
| Laurus Sassafras, *Linn.* | 4 | 234 | 674 |
| *Sassafras tree* | | | |
| Laurus Cassia, *Linn.* | 5 | 25 | 88 |
| *Cassia-tree* | | | |
| Laurus Camphora, *Linn.* | 4 | 236 | 681 |
| *Camphor-tree* | | | |
| **LXIV. MYRISTICEÆ, *R. Br.*** | | | |
| Myristica Moschata, *Thunb.* | 4 | 238 | 698 |
| *Nutmeg-tree* | | | |
| **LXV. THYMELEÆ, *Juss.*** | | | |
| Daphne Mezereum, *Linn.* | 4 | 245 | 717 |
| *Mezereon* | | | |
| **LXVI. SANTALACEÆ, *R. Br.*** | | | |
| Santalum album, *Burm.* (*Sirium myrtifolium*, *Linn. Mant.* & *Roxburgh. Santalum myrtifolium*, *Spreng. syst. Veg.* i. 489.) | 2 | 99 | 280 |
| *Saunders, white or yellow* | | | |
| **LXVII. ARISTOLOCHIEÆ, *Juss.*** | | | |
| Asarum Europæum, *Linn.* | 1 | 66 | 170 |
| *Asarabacca, common* | | | |
| Aristolochia Serpentaria, *Linn.* | 1 | 59 | 153 |
| *Birthwort, snakeroot* | | | |
| Aristolochia longa, *Linn.* | 1 | 60 | 157 |
| *Birthwort, long-rooted* | | | |
| Aristolochia Clematitis, *Linn.* | 1 | 61 | 159 |
| *Birthwort, climbing* | | | |
| **LXVIII. EUPHORBIACEÆ, *Juss.*** | | | |
| Euphorbia officinarum, *Linn.* | 5 | 22 | 74 |
| *Spurge, officinal, or Euphorbia* | | | |
| Clutia Eluteria, *Linn.* | 4 | 223 | 633 |
| *Cascarilla Clutia* | | | |
| Croton Cascarilla, *Linn.* | 4 | 222 | 629 |
| *Cascarilla, or willow-leaved Croton* | | | |
| Croton Tiglium, *Linn.* | 5 | 21 | 71 |
| *Croton, purging* | | | |


* The *Rheum Australe*, *Don. Prodr. Fl. Nepalensis*, *p.* 75, and of *Sweet*, *Brit. Flower Garden*, *tab.* 269, (where its history is given) is now ascertained to be the true officinal Rhubarb.

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Ricinus communis, *Linn.* | 3 | 221 | 624 |
| *Palma Christi tree* | | | |
| Siphonia elastica, *Pers.* | 4 | 224 | 635 |
| *India-rubber, or elastic Resin-tree* | | | |
| **LXIX. URTICEÆ, *Juss.*** | | | |
| Urtica Dioica, *Linn.* | 4 | 241 | 708 |
| *Nettle, common* | | | |
| Parietaria officinalis, *Linn.* | 4 | 239 | 703 |
| *Pellitory of the Wall* | | | |
| Humulus Lupulus, *Linn.* | 5 | 26 | 90 |
| *Hop* | | | |
| Ficus Carica, *Linn.* | 4 | 244 | 714 |
| *Fig-tree, common* | | | |
| Dorstenia Contrajerva, *Linn* | 4 | 240 | 705 |
| *Contrayerva* | | | |
| Morus nigra, *Linn.* | 4 | 243 | 712 |
| *Mulberry-tree, common* | | | |
| **LXX. PIPERACEÆ.** | | | |
| Piper nigrum, *Linn.* | 4 | 246 | 721 |
| *Pepper, black* | | | |
| Piper Cubeba, *Linn.* | 5 | 27 | 95 |
| *Cubebs, or Java pepper* | | | |
| Piper longum, *Linn.* | 4 | 247 | 724 |
| *Pepper, long* | | | |
| **LXXI. ULMACEÆ, *Rich.*** | | | |
| Ulmus campestris, *Linn.* | 4 | 242 | 710 |
| *Elm, common* | | | |
| **LXXII. AMENTACEÆ, *Juss.*** | | | |
| Salix alba, *Linn.* | 5 | 4 | 8 |
| *Willow, common white* | | | |
| Salix fragilis, *Linn.* | 1 | 8 | 18 |
| (*Sir J. E. Smith suspects that this is the Salix Russelliana of English Botany*, tab. 1808) | | | |
| *Willow, crack* | | | |
| Salix capræa, *Linn.* | 5 | 3 | 7 |
| *Sallow, round-leaved* | | | |
| Quercus Robur, *Willd.* | 1 | 10 | 23 |
| *Oak, common* | | | |
| Quercus infectoria, *Oliv.* | 5 | 2 | 4 |
| *Oak, staining* | | | |
| Juglans regia, *Linn.* | 1 | 90 | 20 |
| *Walnut-tree, common* | | | |
| **LXXIII. CONIFERÆ, *Juss.*** | | | |
| Pinus sylvestris, *Linn.* | 1 | 1 | 1 |
| *Fir, Scotch* | | | |
| Pinus Abies, *Linn.* | 1 | 2 | 4 |
| *Fir, Norway Spruce* | | | |
| Pinus Picea, *Linn.* | 1 | 3 | 6 |
| *Fir, silver* | | | |
| Pinus Larix, *Linn.* | 1 | 4 | 7 |
| *Larch, common white* | | | |
| Pinus Balsamea, *Linn.* | 5 | 1 | 1 |
| *Fir, Balm of Gilead* | | | |
| Juniperus communis, *Linn.* | 1 | 6 | 13 |
| *Juniper, common* | | | |
| Juniperus Sabina, *Linn.* | 1 | 5 | 10 |
| *Savin, common* | | | |
| Juniperus Lycia, *Linn.* | 1 | 7 | 16 |
| *Lycian Juniper, or Cedar* | | | |
| **LXXIV. ORCHIDEÆ, *Juss.*** | | | |
| Orchis mascula, *Linn.* | 4 | 264 | 781 |
| *Orchis, male* | | | |
| **LXXV. IRIDEÆ, *Juss.*** | | | |
| Iris Florentina, *Linn.* | 4 | 262 | 776 |
| *Oris, Florentine Iris* | | | |
| Iris Pseudacorus, *Linn.* | 4 | 263 | 778 |
| *Flag, yellow water* | | | |
| Crocus sativus, *Linn.* | 4 | 259 | 763 |
| *Saffron Crocus* | | | |
| **LXXVI. SCITAMINEÆ.** | | | |
| Amonum Zinziber, *Linn.* | 4 | 250 | 731 |
| (*Zinziber officinale*, (*Rosc.*) *Spreng. Syst. Veg.* i. 12) | | | |
| *Ginger, narrow-leaved* | | | |
| Amomum repens, *Sonnerat, vel* Cardamomum, *Linn.* | 4 | 251 | 734 |
| (*Elettaria Cardamomum, White & Maton, in Linn. Trans.* x. 299-255, *tab.* 4, 5. *Alpinia Cardam.* (*Roxb.*) *Spreng. syst. Veg.* i. 14) | | | |
| *Cardamom, officinal* | | | |

| | Vol. | Tab. | Page. |
|---|---|---|---|
| Curcuma longa, *Linn.* | 4 | 252 | 737 |
| *Turmeric, long-rooted* | | | |
| Kæmpferia rotunda, *Linn.* | 4 | 253 | 740 |
| *Zedoary* | | | |
| **LXXVII. SMILACEÆ, *R. Br.*** | | | |
| Convallaria Polygmatum, *Linn.* | 4 | 261 | 774 |
| *Solomon's Seal, common* | | | |
| Smilax Sarsaparilla, *Linn.* | 1 | 62 | 161 |
| *Sarsaparilla Smilax* | | | |
| Smilax China, *Linn.* | 1 | 63 | 164 |
| *Smilax, Chinese* | | | |
| Ruscus aculeatus, *Linn.* | 1 | 64 | 166 |
| *Butcher's-broom, or Knee-holly* | | | |
| **LXXVIII. LILIACEÆ, *De Cand.*** | | | |
| Lilium candidum, *Linn.* | 4 | 254 | 743 |
| *Lily, common white* | | | |
| Allium sativum, *Linn.* | 4 | 256 | 749 |
| *Garlic, common cultivated* | | | |
| Scilla maritima, *Linn.* | 4 | 255 | 745 |
| *Squill, officinal, or sea-onion* | | | |
| Aloe perfoliata, socotorina, *De Cand.* (*Aloe Socotrina,* (*Haw.*) *Spreng. syst. Veg.* ii. 73) | 4 | 260 | 767 |
| *Aloe, Socotorine* | | | |
| Aloe vulgaris, *De Cand.* | 5 | 28 | 98 |
| *Aloe, common* | | | |
| **LXXIX. COLCHICACEÆ, *De Cand.*** | | | |
| Colchicum autumnale, *Linn.* | 4 | 258 | 759 |
| *Meadow-saffron, common* | | | |
| Veratrum album, *Linn.* | 4 | 257 | 753 |
| | 5 | | 144 |
| *Veratrum, or white Hellebore* | | | |
| **LXXX. PALMÆ, *Juss.*** | | | |
| Calamus Rotang, *Linn.* (*Calamus petræus,* (*Loureiro*) *Spreng. Syst. Veg.* ii. 16) | 4 | 265 | 785 |
| *Rotang cane* | | | |
| **LXXXI. AROIDEÆ, *Juss.*** | | | |
| Arum maculatum, *Linn.* | 4 | 249 | 727 |
| *Wake-Robin, or common Arum* | | | |
| Acorus Calamus, *Linn.* | 4 | 248 | 725 |
| *Sweet-flag, or Acorus* | | | |
| **LXXXII. GRAMINEÆ. *Juss.*** | | | |
| Triticum hybernum, *Linn.* | 5 | 29 | 101 |
| *Wheat, Lammas, or Winter* | | | |
| Hordeum distichon, *Linn.* | 5 | 29 | 105 |
| *Barley, common* | | | |
| Avena sativa, *Linn.* | 5 | 29 | 107 |
| *Oat, common* | | | |
| Saccharum officinarum, *Linn.* | 4 | 266 | 789 |
| *Sugar-cane, common* | | | |
| **LXXXIII. FILICES, *Juss.*** | | | |
| Polypodium vulgare, *Linn.* | 4 | 268 | 797 |
| *Polypody, common* | | | |
| Polypodium Filix, mas. *Linn.* (*Aspidium Filix mas.* (*Sw.*) *Spreng. Syst. Veg.* iv. 105) | 4 | 267 | 795 |
| *Polypody male, or com. male Fern* | | | |
| Asplenium Scolopendrium, *Linn.* | 4 | 269 | 799 |
| *Hart's-tongue* | | | |
| Asplenium Trichomanes, *Linn.* | 4 | 270 | 801 |
| *Spleenwort, or com. Maiden's-hair* | | | |
| **LXXXIV. LICHENES, *De Cand.*** | | | |
| Lichen Islandicus, *Linn.* (*Cetraria Islandica, Acharius*) | 4 | 271 | 803 |
| *Lichen, eryngo-leaved* | | | |
| Lichen caninus, *Linn.* (*Pettidea canina, Acharius*) | 4 | 272 | 806 |
| *Liverwort, ash-coloured ground* | | | |
| Roccella tinctoria, *Achar.* | 5 | 30 | 108 |
| *Orchal, or Dyer's-moss* | | | |
| **LXXXV. FUNGI, *De Cand.*** | | | |
| Boletus igniarius, *Linn.* | 4 | 273 | 808 |
| *Touchwood Agaric, or Boletus* | | | |
| **LXXXVI. ALGÆ.** | | | |
| Fucus vesiculosus, *Linn.* | 5 | 31 | 111 |
| *Bladderwrack, or Fucus.* | | | |


FINIS.

IN ONE VOLUME, ROYAL FOLIO,

*With* 28 *finely engraved plates by W. Hooker, from Drawings by F. Bauer,*

# DIGITALIUM MONOGRAPHIA,

SISTENS HISTORIAM BOTANICAM GENERIS, TABULIS OMNIUM SPECIERUM ILLUSTRATAM, AD ICONES FERDINANDI BAUERI, PENES GUIL. CATTLEY, ARM.

CURA

JOANNIS LINDLEY,

SOC. LINN. ET HORT. SODAL.

*Price, plain* 1*l.* 11*s.* 6*d.*, *or beautifully coloured* 3*l.* 3*s.*, *being half the original Subscription Price.*